388

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CIRCUIT CHANGES IN CHASSIS 406 & 406-1

406 (Code A)

406-1 (Code A)

The circuit shown in Figure 1 appears only in chassis 406 (Code A) and 406-1 (Code A). Chassis coded B and C have the circuit shown in the complete schematic. The change was made to improve the contrast ratio.

Figure 2 shows two capacitors (.005 mfd.) that appear in chassis 406 (Code A) and 406-1 (Code A). These capacitors were not used in later production chassis coded B and C.

406 (Codes A & B)

406-1 (Codes A & B)

The circuit shown in Figure 3 appears in chassis 406 (Code A & B) and chassis 406-1 (Codes A & B0. Chassis with Code C have the circuit shown in the complete schematic. The change which was made to allow for greater heat dissipation in the cathode circuit of the vertical output tube, in Figure 3, R160 was 68 ohm, 10%, 2 watt resistor (part number 39374-211); R192 was a 2700 ohm, 10%, 1 watt resistor (part number 39374-118); R152 was part number 154088, 750 ohms, 1/4 watt. The parts used on chassis coded C are given in the Schematic Replacement Parts List (pages 16 and 17).

The circuit shown in Figure 4 appears in chassis 406 (Codes A & B) and chassis 406-1 (Codes A & B). In chassis coded C, the circuit appears as shown in the complete schematic. In earlier production, R189 was a 180,000 ohm, 10%, 1/2 watt resistor (part number 39374-52). See the Schematic Replacement Parts List (pages 16 and 17) for the part used in chassis coded C.

406 (Codes B & C)

406-1 (Codes B & C)

The above chassis have a provision for greater heat dissipation in the screen circuit of the 6BQ6. This is accomplished in two ways: (1) Part No. 156911-1 is used for R183, for under test, it shows more than its rated 2 watt heat dissipation ability. (2) Two resistors are used in place of one and are wired in parallel. The resistors are 33,000 ohm, 10%, 1 w. (Part No. 39374-131), and 15,000 ohm, 10%, 2 w. (Part No. 39374-215).

CODE A

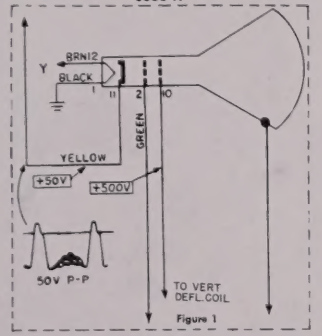


Figure 1

CODES A & B

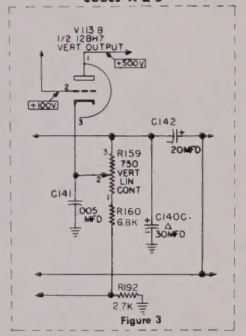


Figure 3

CODE A

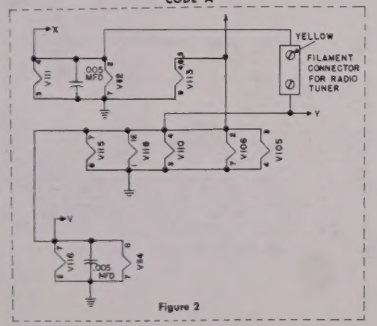


Figure 2

CODES A & B

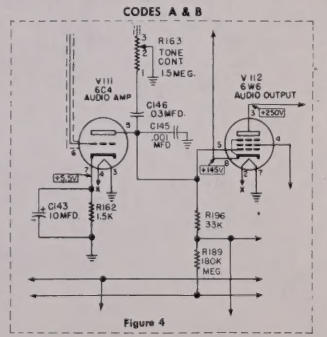
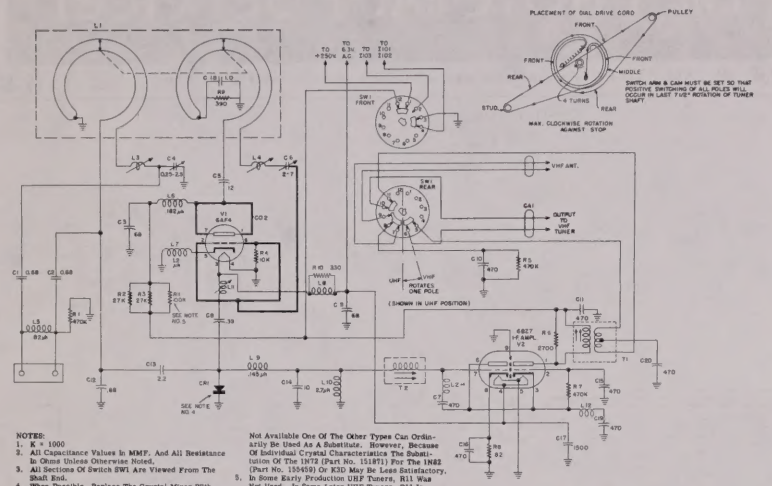


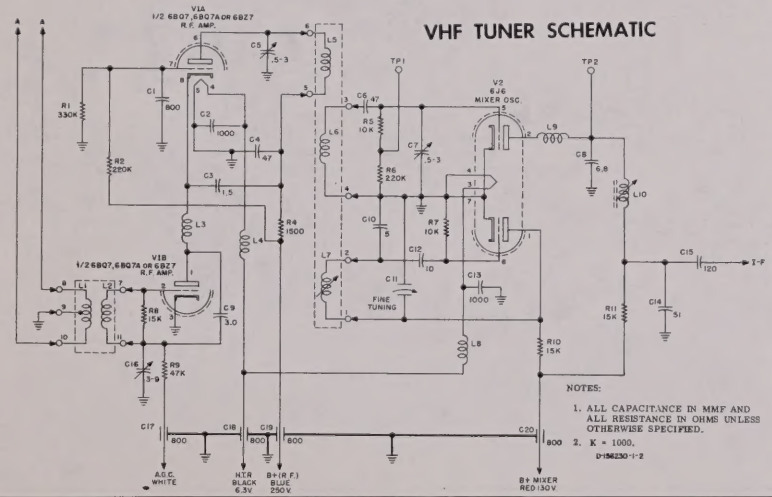
Figure 4

UHF CONVERTER SCHEMATIC



NOTES:
1. K = 1000
2. All Capacitance Values In MMF. And All Resistance In Ohms Unless Otherwise Noted.
3. All Sections Of Switch SW1 Are Viewed From The Shaft End.
4. When Possible, Replace The Crystal Mixer With One Of The Same Type. When The Same Type Is Not Available One Of The Other Types Can Ordinarily Be Used As A Substitute. However, Because Of Individual Crystal Characteristics The Substitution Of The 1N72 (Part No. 151871) For The 1N82 (Part No. 155459) Or K3D May Be Less Satisfactory.
5. In Some Early Production UHF Tuners, R11 Was Not Used. In Some Later UHF Tuners, R11 Is 7,000 Ohms, 10%, 1/2 Watt.

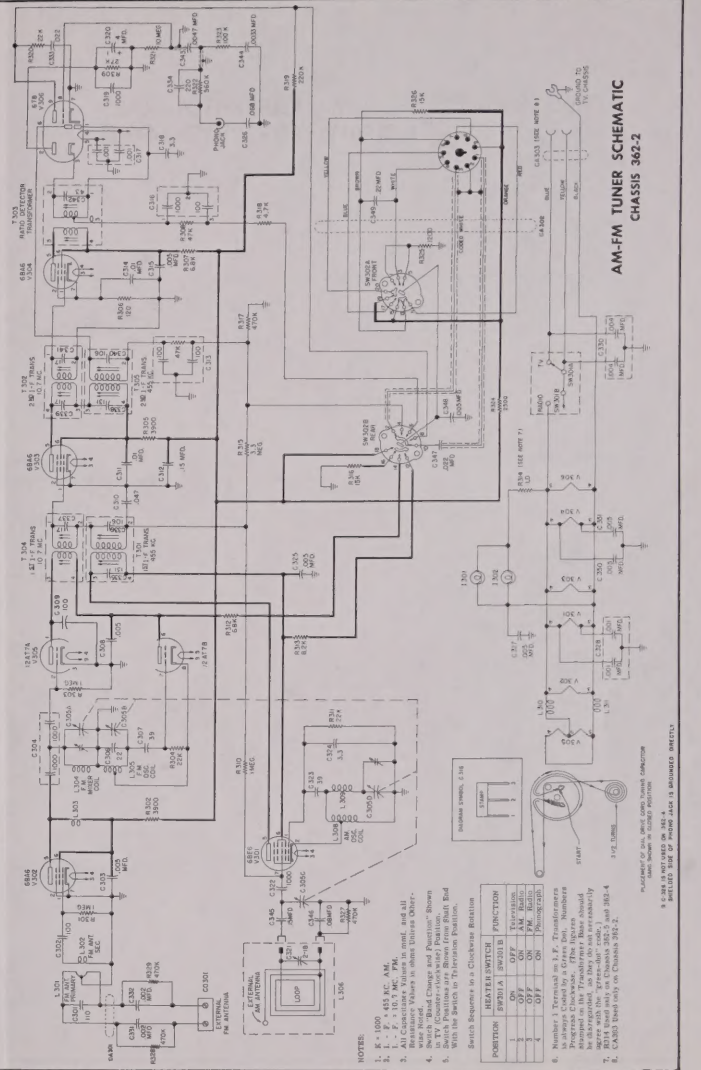
VHF TUNER SCHEMATIC



NOTES:
1. ALL CAPACITANCE IN MMF AND ALL RESISTANCE IN OHMS UNLESS OTHERWISE SPECIFIED.
2. K = 1000.

D-156230-1-2

AM-FM TUNER SCHEMATIC
CHASSIS 362-2



NOTES:
1. K = 1000
2. All Values Are In MMF. And All Resistance Values In Ohms Unless Otherwise Noted.
3. Switch Shown In Broadcast Position. Rotate Switch Counter-Clockwise For Short Wave Position. Rotate Switch Clockwise For FM Position.
4. Switch Shown In Phonograph Position. Rotate Switch Counter-Clockwise For Tuner Position.
5. Switch Sequence In a Clockwise Rotation With the Switch in Tuner Position Is:

POSITION	HEATER SWITCH SECTION A	HEATER SWITCH SECTION B	FUNCTION
1	ON	OFF	Television
2	OFF	ON	AM Radio
3	OFF	ON	FM Radio
4	OFF	ON	Phonograph

6. Number 1 Terminal on I.F. Transformers is always Coded by a Green Dot. Numbers Progress in the Proper Sequence.
7. Tuning Slugs Should be Approximately Flush With Top of Can. Slugs Should be Fully Counterclockwise For Maximum Inductance.
8. 6U8 Used only on Chassis 383-5 and 383-4
9. CA353 Used only on Chassis 382-2.

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The PHOTOFACT Servicer

Vol. 39..Set 388 ★ Published for all users of Howard W. Sams' Photofact Folders ★ Feb. 1, 1958

CROSLEY MODELS F-21PDMH, F21PDBH (Ch. 406)
F-21PDMU, F21PDBU (Ch. 406-1)

The service information in this Servicer provides data on models which we have been unable to present in PHOTOFACT Folders. The receivers are not in current production; a requirement for PHOTOFACT coverage, and we are therefore presenting schematics and supplementary data that will be of assistance when servicing these models.

SCHEMATIC DIAGRAM COURTESY CROSLEY DIV., AVCO MFGR. CORP.

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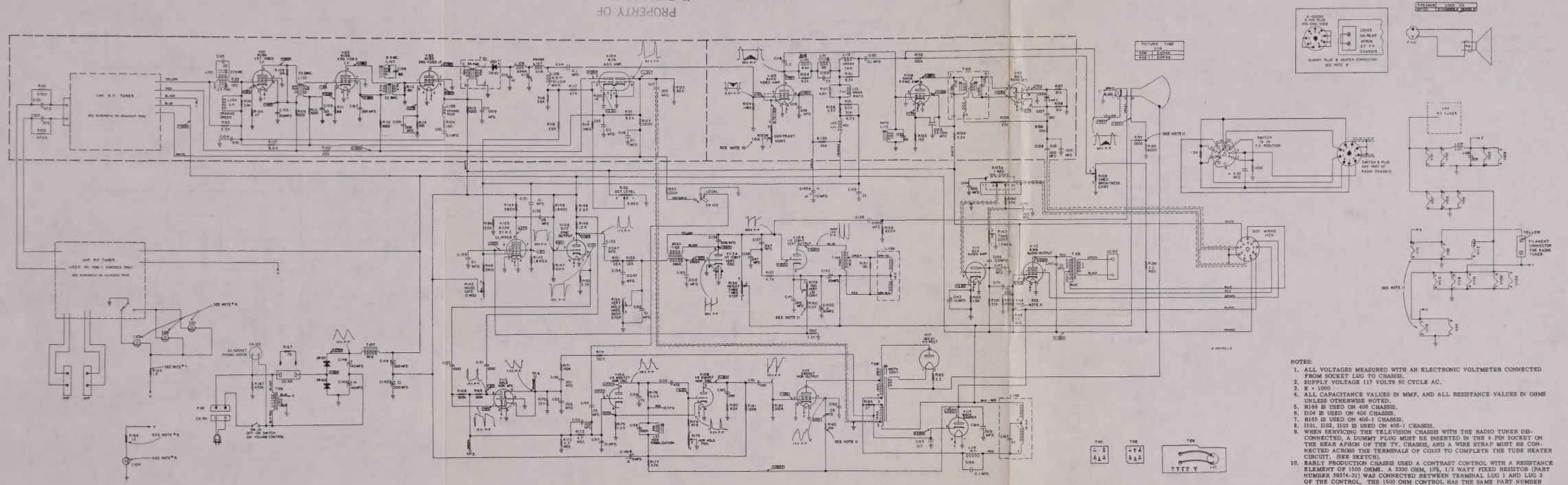


NOTES:

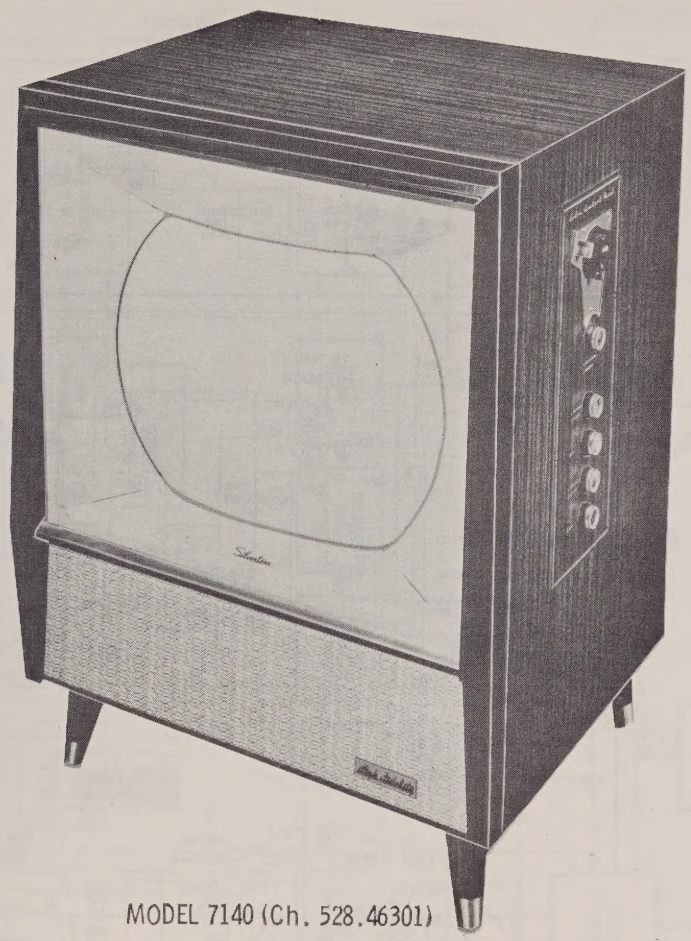
1. ALL VOLTAGES MEASURED WITH AN ELECTRONIC VOLTMETER CONNECTED FROM SOCKET LUG TO CHASSIS.
2. SUPPLY VOLTAGE 117 VOLTS 60 CYCLE AC.
3. K = 1000
4. ALL CAPACITANCE VALUES IN MMF, AND ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE NOTED.
5. R106 IS USED ON 406 CHASSIS.
6. I104 IS USED ON 406 CHASSIS.
7. R105 IS USED ON 406-1 CHASSIS.
8. I101, I102, I103 IS USED ON 406-1 CHASSIS.
9. WHEN SERVICING THE TELEVISION CHASSIS WITH THE RADIO TUNER DISCONNECTED, A DUMMY PLUG MUST BE INSERTED IN THE 9 PIN SOCKET ON THE REAR APRON OF THE TV. CHASSIS, AND A WIRE STRAP MUST BE CONNECTED ACROSS THE TERMINALS OF CO103 TO COMPLETE THE TUBE HEATER CIRCUIT. (SEE SKETCH).
10. EARLY PRODUCTION CHASSIS USED A CONTRAST CONTROL WITH A RESISTANCE ELEMENT OF 1500 OHMS. A 3300 OHM, 10%, 1/2 WATT FIXED RESISTOR (PART NUMBER 39374-31) WAS CONNECTED BETWEEN TERMINAL LUG 1 AND LUG 3 OF THE CONTROL. THE 1500 OHM CONTROL HAS THE SAME PART NUMBER (155580-1) AS THE 1000 OHM CONTROL. THE SERVICE DEPT. WILL FURNISH ONLY THE 1000 OHM CONTROL. WHEN USING THIS CONTROL, DO NOT USE THE 3300 OHM RESISTOR SHUNT. (NO CODE LETTER IS USED TO DESIGNATE THIS CHANGE.)
11. SEE (CODE CHANGES) FOR CIRCUITS THAT WERE CHANGED DURING PRODUCTION.

PHOTOFACT* Folder

*TRADE MARK

SILVERTONE MODELS 7138, 7140, 7142 (Ch. 528.46300, 528.46301)

SILVERTONE MODELS 7138, 7140, 7142 (Ch. 528.46300, 528.46301)



MODEL 7140 (Ch. 528.46301)

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DENVER, COLORADO

SILVERTONE MODELS 7138, 7140, 7142 (Ch. 528.46300, 528.46301)

TRADE NAME	Silvertone	MODELS	CHASSIS
		7140, 7142	528.46300
		7138, 7140, 7142	528.46301
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois		
TYPE SET	Color Television Receiver		
TUBES	Twenty-six		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 315 Watts, 3.1 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

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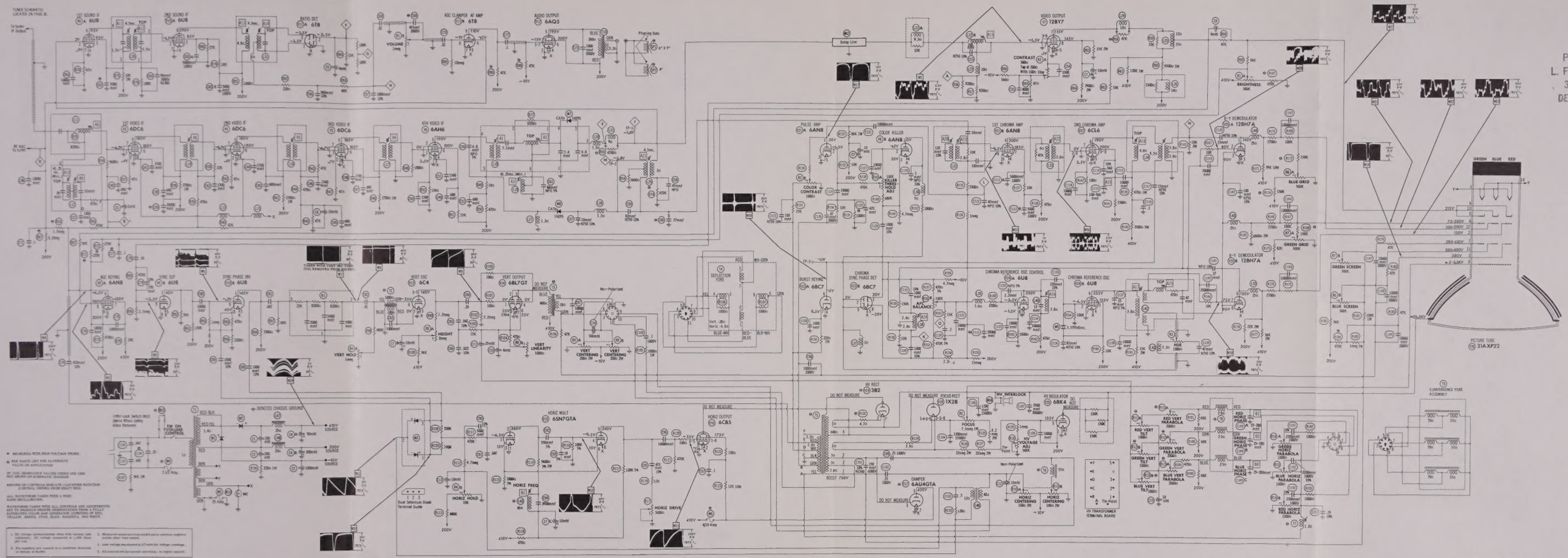
H168

FOLDER 1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3924 MEADE St.
DENVER, COLORADO
SILVERTONE MODELS 7138, 7140,
7142 (Ch. 528.46300, 528.46301)
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

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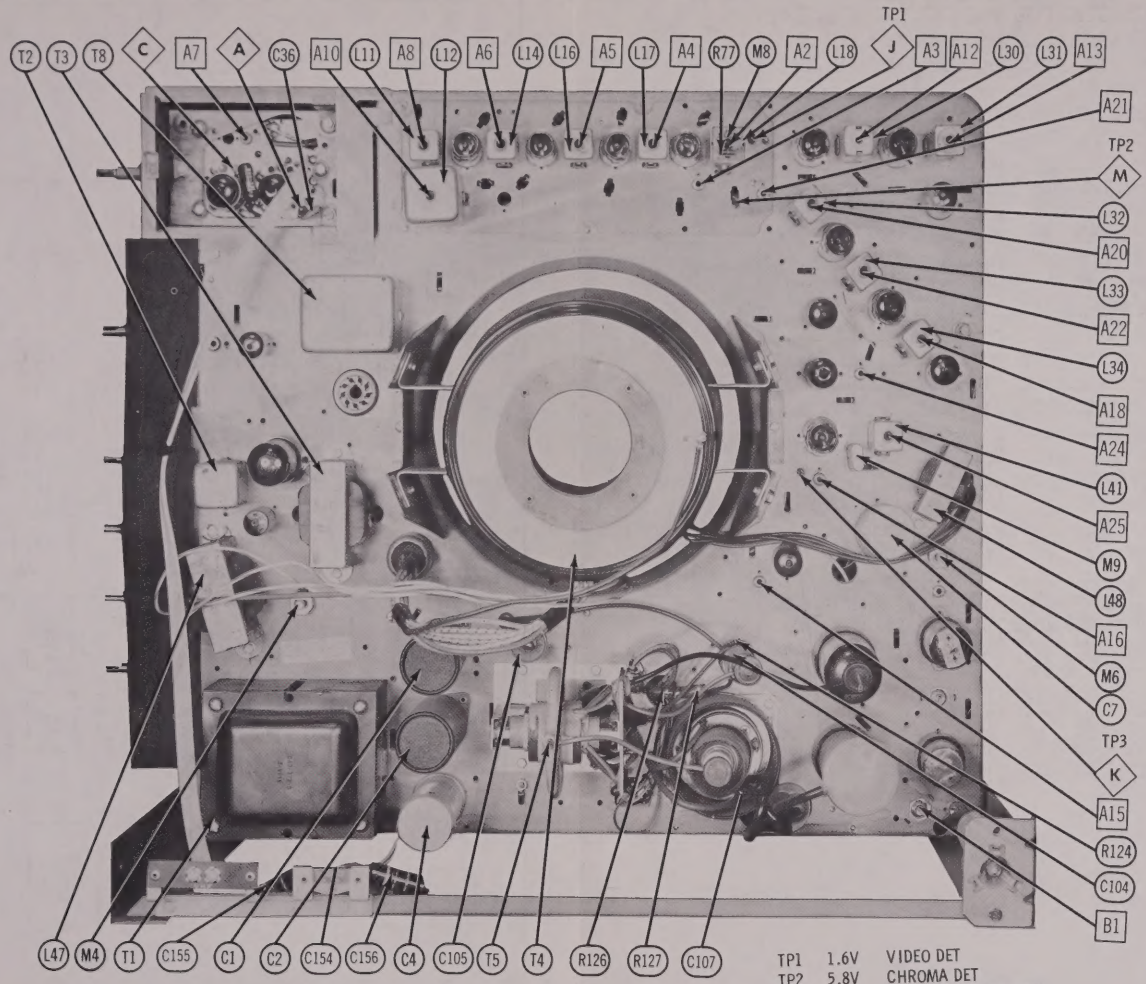
DENVER, COLORADO

SILVERTONE MODELS 7138, 7140, 7142
(Ch. 528.46300, 528.46301)

BLOCK DIAGRAM



CHASSIS TOP VIEW

MISCELLANEOUS ADJUSTMENTS

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Before making this adjustment, make sure that the line voltage applied to the receiver is 117 volts.
Set the horizontal hold control to the center of its range and adjust horizontal frequency slug (B1) until the picture synchronizes horizontally.
Adjust the horizontal drive control (R17) until drive lines appear (vertical white lines near the center of the raster) in the picture, and back drive off until the drive lines disappear.
Connect the high voltage probe of a VTVM to the high voltage anode of the picture tube. Turn the contrast and brightness controls fully counter clockwise. Adjust the high voltage control (R18) for 3KV less than the maximum obtainable. WARNING: The high voltage in a color receiver is lethal; extreme caution must be used in measuring same.

PURITY ADJUSTMENTS

Adjust height and vertical linearity controls for a full scan and proper linearity. Check for correct positioning of the convergence yoke assembly, purity magnet and the blue lateral positioning magnet.
Connect a dot generator to the antenna terminals and tune receiver and dot generator to the same channel used. Turn all dynamic convergence controls with the exception of the horizontal phase trimmers fully counter clockwise.

STEP	ADJUST	REMARKS
1.	Red, green and blue convergence magnets and blue lateral magnet.	Adjust for converged dot in the center of screen. Turn dot generator off.
2.	All screen and grid controls.	Turn fully counter clockwise.
3.	Contrast control.	Turn fully counter clockwise.
4.	Brightness control.	Turn clockwise until red raster can be seen.
5.	Focus control.	Adjust for proper focus.
6.	Purity magnet.	Adjust to place red tabs together.
7.	Field equalizing magnets.	Pull all eight magnets away from picture tube as far as possible.
8.	Deflection yoke.	Adjust to best location for best overall red purity of raster. DO NOT tilt yoke.
9.	Purity magnet.	Rotate either or both red tabs on the purity magnet until the center of the raster has good purity with any contamination located near the edges only. If necessary, repeat steps 8 and 9.
10.	Field Equalizing magnets.	Adjust field equalizing magnets to get an overall perfect red raster. If it is impossible to obtain good purity, degaussing may be necessary.
11.	Blue and green grid and screen controls.	Adjust for nearly white raster.
12.	Equalizing magnets.	Retouch, if necessary, where needed for best white raster.
13.	Turn on dot generator and reconverge dots at center of screen as in step 1.	

VERTICAL CONVERGENCE ADJUSTMENTS

STEP	ADJUST	REMARKS
1.	Blue grid and screen controls.	Turn fully counter clockwise.
2.	Red and green vertical parabola and vertical tilt controls.	Adjust until the center rows of vertical red and green dots are vertically straight and parallel to each other.
3.	Red and green convergence magnets.	Adjust to converge center rows of red and green dots to form a row of yellow dots. Repeat steps 2 and 3, if necessary.
4.	Blue grid and screen controls.	Turn clockwise until blue dots are equal in intensity to the yellow dots.
5.	Blue vertical parabola and vertical tilt controls.	Adjust until the center vertical row of blue dots are parallel with the center row of yellow dots.
6.	Blue convergence and blue lateral positioning magnets.	Adjust to converge center vertical row of blue dots with yellow dots to form a row of white dots.
7.	Repeat step 1.	

HORIZONTAL CONVERGENCE ADJUSTMENTS

STEP	ADJUST	REMARKS
1.	Red horizontal parabola control.	Turn fully clockwise.
2.	Red horizontal phase (B2).	Adjust so that the point of maximum displacement of the red dots is in the center of screen.
3.	Red horizontal parabola control.	Turn fully counter clockwise.
4.	Green horizontal parabola control.	Turn fully clockwise.
5.	Green horizontal phase (B3).	Adjust so that the point of maximum displacement of green dots is in the center of screen.
6.	Red and green horizontal parabola and phase adjustments.	Retouch until the center row of horizontal red and green dots are straight and parallel.
7.	Red and green convergence magnets.	Adjust to converge center horizontal row of red and green dots to form a row of yellow dots. Repeat steps 6 and 7, if necessary.
8.	Blue grid and screen controls.	Turn clockwise until blue dots are equal in intensity with the yellow dots.
9.	Blue horizontal parabola and phase (B4).	Adjust until center horizontal row of blue dots is parallel with center row of yellow dots.
10.	Blue convergence and blue lateral positioning magnets.	Adjust to converge center horizontal row of dots to form a row of white dots. Repeat all convergence adjustments until optimum results are obtained.

GRAY SCALE ADJUSTMENTS

1. Tune in a normal black and white picture.
2. Set the blue and green grid controls and the brightness control to the center of their ranges and turn the contrast control fully counter clockwise.
3. Adjust the three screen controls to produce a neutral gray screen.
4. Advance the contrast control and observe the picture. If one or more of the colors should happen to predominate in the low light areas, reduce these colors with the proper screen controls and adjust the proper grid controls for a gray screen. Repeat step 4 as necessary.

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ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Remove RF Amplifier, 6BS8 (V1).

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.01mfd	High side to pin 1 (grid) of 6AH6 (V6). Low side to chassis.	44.0MC (10MC Swp)	41.25MC 41.7MC 42.75MC 45.75MC	Any non-interfering channel	Vert. Amp. thru 10K to point (A). Low side to chassis.	A1, A2, A3	Adjust A1 for maximum gain at 45.75MC marker and A2 for maximum gain at 42.75MC marker. Adjust A3 to place 41.25MC marker in trap notch as in Fig. 1. If necessary, retouch A1 thru A3 for response similar to Fig. 1.
2.	"	High side to pin 1 (grid) of 6DC6 (V3). Low side to chassis.	"	41.25MC 41.7MC 42.5MC 44.0MC 45.0MC 45.75MC	"	"	A4, A5, A6	Disconnect L11 from pin 1 of V3. Connect the negative lead of a 5 volt bias supply to point (B). Positive to chassis. Adjust A4 for maximum at 45.0MC. If necessary, retouch A4 thru A6 for response similar to Fig. 2.
3.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead. High side of separator marker generator thru 120Ω to point (C). Low side to chassis.	Any high unused channel	41.25MC 41.7MC 42.75MC 45.75MC 47.25MC	Any high unused channel	Vert. Amp. to 6DC6 (V3) thru detector network (Fig. 3). Low side to chassis.	A7, A8, A9, A10	Reconnect L11. Replace RF amplifier tube (V1) in its socket. Connect the negative lead of a 2 volt bias supply to point (B) Positive to chassis. Connect clip lead from point (D) to point (B). Adjust A7 for maximum gain at 42.75MC marker, A8 for maximum at 45.75MC, A9 to place 47.25MC marker in trap notch and A10 to place 41.25MC marker in other trap notch. If necessary, retouch A8, A9 and A10 for response similar to Fig. 4.
4.	"	"	"	"	"	Vert. Amp. thru 10K to point (A). Low side to chassis.		Check for response similar to Fig. 5. If tilt is present, retouch A6, A5, A7 and A4 to level curve. The 41.25MC trap notch should be examined very carefully to make sure that the two traps form a single point. If not, perform step 5. Otherwise go on to step 6.
5.	Direct	High side to ungrounded tube shield floating over mixer-osc. tube (V2). Low side to chassis.	Not used	41.25MC	Any non-interfering channel	USE VTVM. DC probe thru 10K to point (A). Common to chassis.	A3, A10	Adjust for MINIMUM deflection on VTVM. DO NOT CHANGE ANY OTHER ADJUSTMENTS. Remove test equipment and bias.
6.	.01mfd	High side to point (E). Low side to chassis.	3.0MC (6MC Swp)	3.1MC 3.58MC	"	Vert. Amp. to pin 13 (cathode) of picture tube.		Response curve should be similar to Fig. 6.

SOUND IF ALIGNMENT

Connect two matched 100K (±1%) resistors in series from point (F) to chassis. The junction of these two resistors is alignment point (G) as shown on the schematic.
Connect a short clip lead from pin 1 (grid) of 6DC6 (V5) to chassis.
Use only enough generator output to provide a usable indication on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
7.	.001mfd	High side to pin 2 (grid) of 6U8 (V9). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to point (F). Common to chassis.	A11, A12, A13	Adjust for maximum deflection.
8.	"	"	"	"	DC probe to point (H). Common to point (G).	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Remove short from V5. Remove 100K resistors.

3.58MC TRAP ALIGNMENT

Remove 6DC6 (V5) from its socket. Connect a 3.58MC signal to point (J). Low side to chassis. Connect the vertical amplifier of the scope thru a low capacity probe to the cathode (Pin 4, 5 or 13) of the picture tube. Adjust A15 for MINIMUM output. Remove the test equipment connections.

ALIGNMENT INSTRUCTIONS (cont)

CHROMA AFC ADJUSTMENTS

Be extremely careful when soldering near any crystal because heat will ruin them. Remove the 6DC6 (V5) from its socket.
1. Connect the vertical amplifier of the scope to pin 7 (grid) of the 12BH7 (V25). Low side to chassis.
2. Adjust A16 and A17 for maximum sub-carrier indication on the scope. (30 volts peak to peak MINIMUM).
3. Connect the vertical amplifier of the scope to point ⟨K⟩. Set the horizontal frequency of the scope to 7875 cps.
4. Adjust A18 and A19 alternately for MINIMUM subcarrier on the scope.
5. Move the scope connection to pin 6 (green grid) of the picture tube. Connect a clip lead from point ⟨L⟩ to chassis. Remove the 3.58MC crystal (M9) from its socket. Connect the high side of a crystal controlled 4.5MC generator to point ⟨M⟩. Low side to chassis. Misadjust A21 and A22 by turning out of position a few turns. Adjust A20, A21 and A22 in numerical order for MINIMUM indication on scope.
6. Remove the signal generator. Connect the sweep generator thru a 3300Ω resistor to point ⟨M⟩. If a separate marker generator is used, connect thru a 120mfd capacitor to the high side of the sweep generator. Connect the vertical amplifier of the scope thru a demodulator probe to point ⟨N⟩. Low side to chassis. Connect a .001mfd capacitor across the probe leads for a cleaner trace. Connect a 4700Ω resistor from point ⟨N⟩ to chassis. Set the sweep generator for 2.5MC at 5MC sweep. Set marker to 3.1MC. Adjust A22 for maximum amplitude at the 3.1MC marker. Adjust A23 so that 4MC region of curve is the same amplitude as 3.1MC region as in Fig. 7.
7. Reinsert 3.58MC crystal. Remove the short from point ⟨L⟩ to chassis. Disconnect sweep and marker generators, demodulator probe and the 4700Ω resistor from point ⟨N⟩. Connect the scope thru a low capacity probe to point ⟨K⟩. Low side to chassis. Retouch A18 and A19 for MINIMUM 3.58MC subcarrier on scope.
8. Connect the color bar generator to the antenna terminals and adjust the fine tuning for the proper picture. Connect the vertical amplifier of the scope to point ⟨K⟩. Low side to chassis. Adjust A24 for maximum amplitude.
9. Connect the DC probe of the VTVM to point ⟨O⟩. Common to chassis. Remove the 3.58MC crystal from its socket. Adjust AFC balance control (R16B) for zero deflection on the VTVM. Replace the crystal in its socket.
10. Connect the vertical amplifier of the scope to pin 2 (red grid) of the picture tube. Low side to chassis. Set the "Hue" control (R3) to the center of its range. Set the color contrast control (R2B) at the center of its range or a little below (just before overload begins). It is extremely important that the color contrast control does not overload the set. Retouch A16 until the pattern locks on the scope. Continue adjustment until the VTVM (at point ⟨O⟩) reads zero.
11. Retouch A24 for proper R-Y waveform similar to that shown in Fig. 8.
12. Move scope connect to pin 12 (blue grid) of picture tube and adjust A25 for proper B-Y waveform similar to that shown in Fig. 8.
13. Turn the color killer threshold control (R16A) fully counter clockwise. Connect DC probe of VTVM to pin 2 (grid) of 6AN8 (V21). Common to chassis. With the chroma reference oscillator locked to the color bar signal, the voltage should read between -15 and -25 volts. With no signal applied, the voltage should read approximately -2 volts.

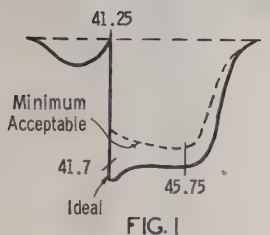


FIG. 1

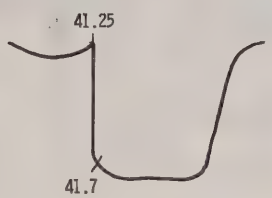


FIG. 2

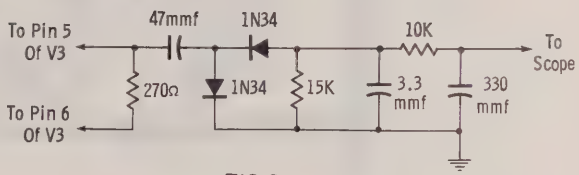


FIG. 3

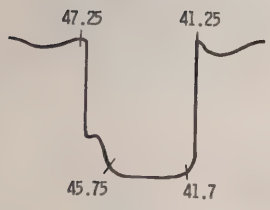


FIG. 4

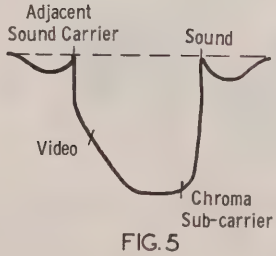


FIG. 5

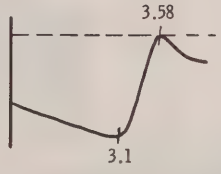


FIG. 6

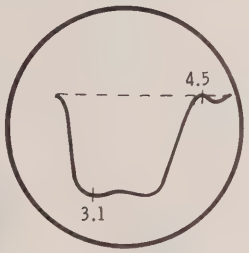


FIG. 7

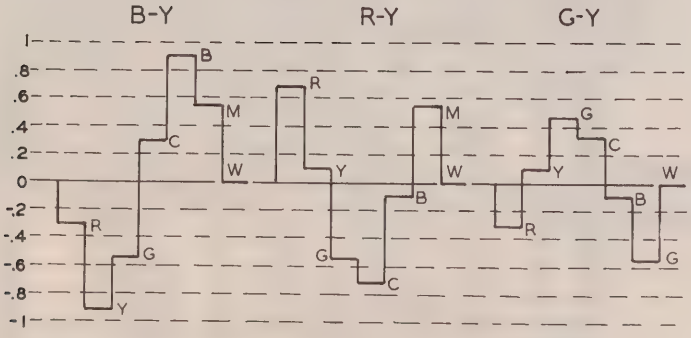
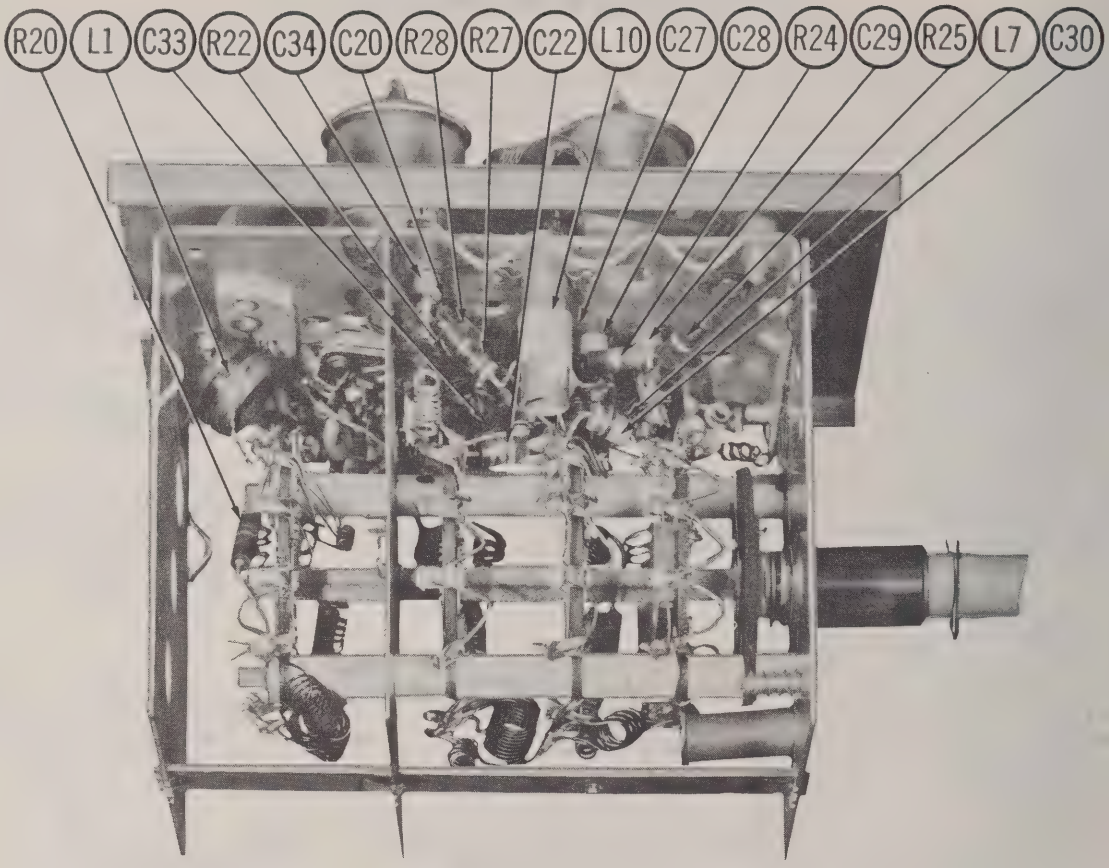


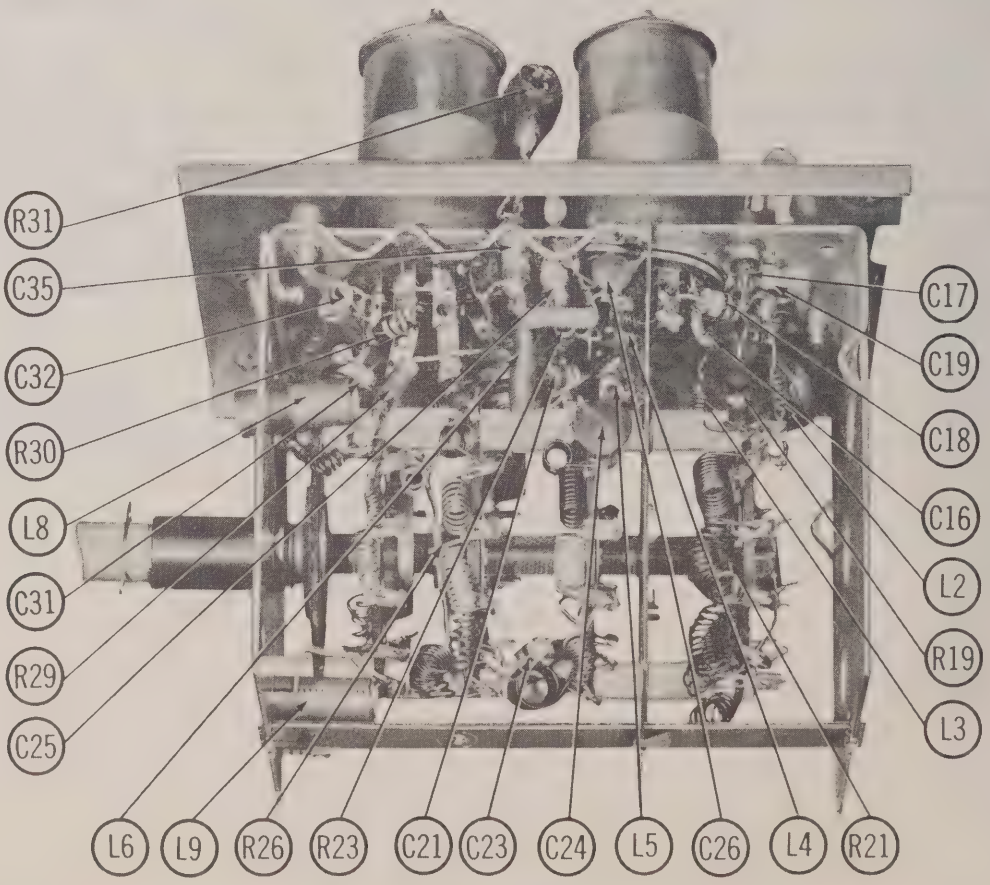
FIG. 8

SILVERTONE MODELS 7138, 7140, 7142 (Ch. 528.46300, 528.46301)

FOLDER 1



RF TUNER-LEFT SIDE



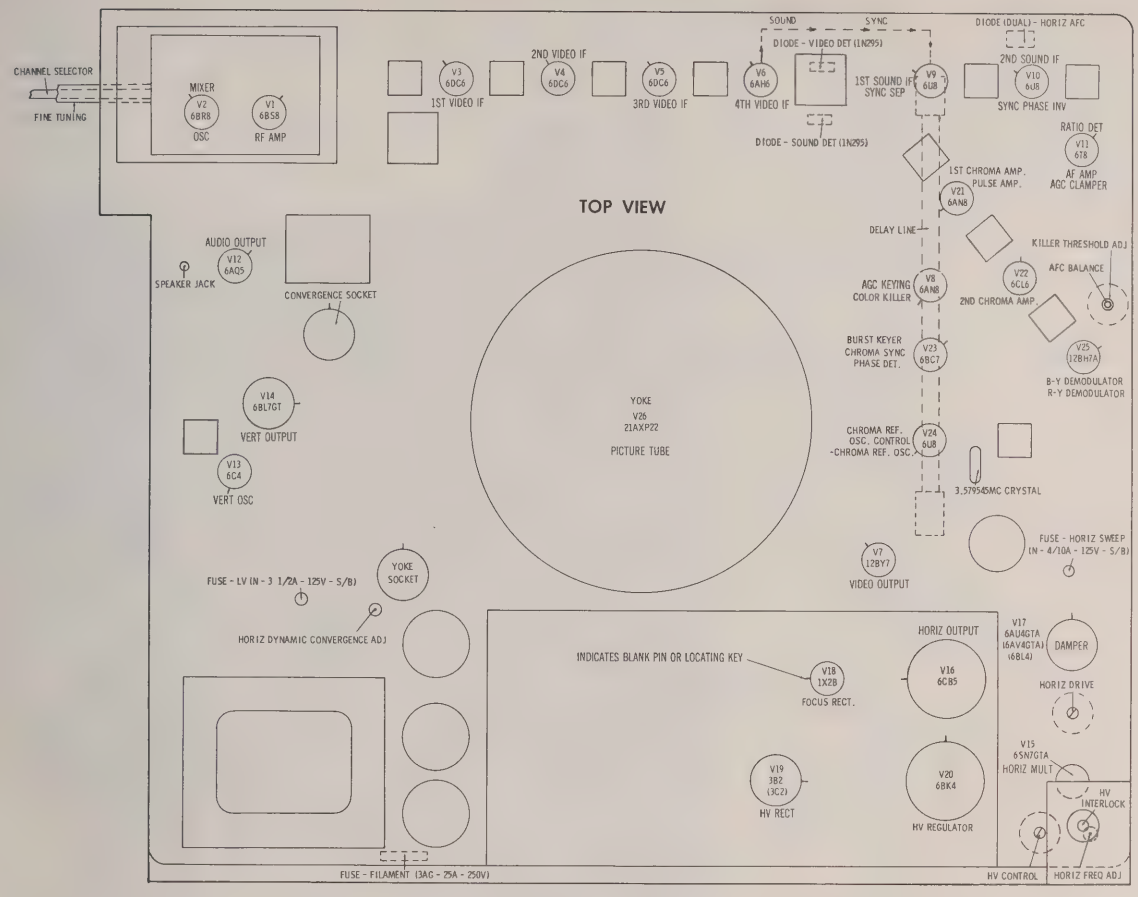
RF TUNER-RIGHT SIDE

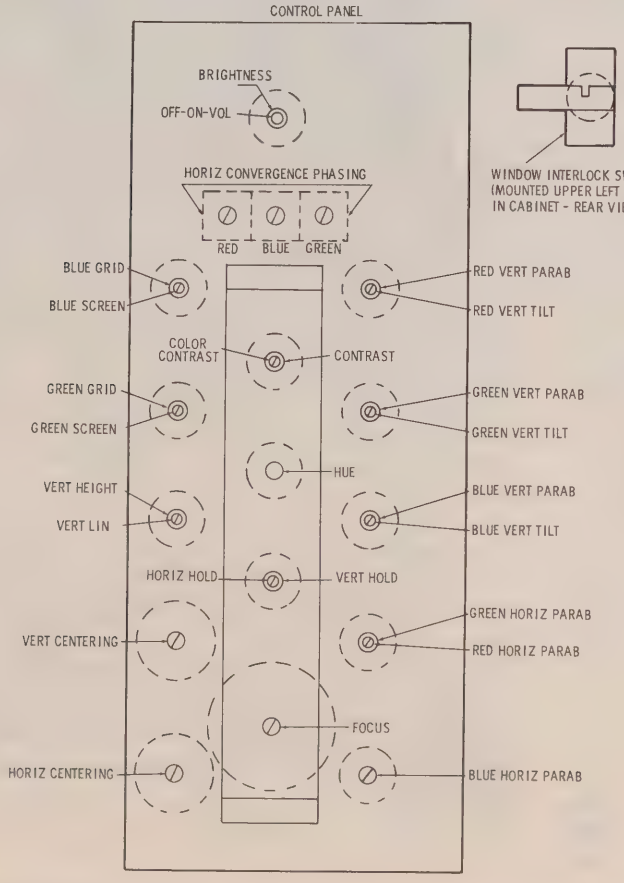
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BS8	†6500Ω	450K	INF	0Ω	.1Ω	INF	1.6meg	0Ω	0Ω
V2	6BR8	15K	†16K	0Ω	0Ω	.1Ω	†13K	†11K	0Ω	220K
V3	6DC6	95K	47Ω	0Ω	.1Ω	†2700Ω	†2700Ω	0Ω		
V4	6DC6	95K	47Ω	0Ω	.1Ω	†2700Ω	†2700Ω	0Ω		
V5	6DC6	47K	47Ω	0Ω	.1Ω	†2700Ω	†2700Ω	0Ω		
V6	6AH6	.2Ω	0Ω	0Ω	.1Ω	†490Ω	†15K	150Ω		
V7	12BY7	• 80Ω	8200Ω	0Ω	.1Ω	.1Ω	0Ω	†5500Ω	†3200Ω	0Ω
V8	6AN8	1800Ω	5.5meg	4.7meg	.1Ω	0Ω	550K	ǂ10K	†62K	†4700Ω
V9	6U8	†50K	470K	†10K	0Ω	.1Ω	†10K	82Ω	0Ω	2.7meg
V10	6U8	†3300Ω	100K	†19K	0Ω	.1Ω	†1000Ω	0Ω	2700Ω	†1meg
V11	6T8	INF	15K	INF	0Ω	.1Ω	1.4meg	0Ω	10meg	†47K
V12	6AQ5	47K	0Ω	0Ω	.1Ω	†260Ω	†0Ω	47K		
V13	6C4	• ǂ1.8meg	NC	.1Ω	0Ω	• ǂ1.8meg	•1meg	180Ω		
V14	6BL7GT	2.2meg	ǂ400Ω	• 680Ω	2.2meg	ǂ400Ω	•680Ω	.1Ω	0Ω	
V15	6SN7GTA	5.2meg	ǂ6100Ω	1800Ω	100K	ǂ120K	1800Ω	0Ω	.1Ω	
V16	6CB5	ǂ12K	.1Ω	0Ω	470K	470K	0Ω	0Ω	ǂ12K	TOP CAP ††5Ω
V17	6AU4GTA	NC	NC	¶	NC	ǂ0Ω	NC	.1Ω	0Ω	
V18	1X2B	NC	11meg	NC	NC	NC	NC	11meg	NC	11meg
V19	3B2		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP ††645Ω
V20	6BK4	†0Ω	.1Ω	NC	NC	•1.1meg	NC	0Ω	NC	TOP CAP INF
V21	6AN8	†13K	5.8meg	0Ω	.1Ω	0Ω	†470Ω	†10K	6meg	0Ω
V22	6CL6	100Ω	2.6Ω	†3300Ω	0Ω	.1Ω	ǂ3900Ω	0Ω	†3300Ω	2.6Ω
V23	6BC7	4.7meg	2Ω	0Ω	0Ω	.1Ω	2.4Ω	200Ω	5meg	2Ω
V24	6U8	†470Ω	100K	†10K	.1Ω	0Ω	ǂ15K	0Ω	1800Ω	5.2meg
V25	12BH7A	†35K	17K	6800Ω	.1Ω	.1Ω	†28K	17K	6800Ω	0Ω
V26	21AXP22	INF	†110K	†410K	ǂ40K	ǂ40K	• ǂ75K	• †250K	NC	•10meg
		PIN 10 NC	PIN 11 • †260K	PIN 12 • ǂ85K	PIN 13 ǂ40K	PIN 14 INF				

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 200V SOURCE.
†† MEASURED FROM PIN 3 OF V17.
ǂ MEASURED FROM 410V SOURCE.
NC NO CONNECTION.

TUBE PLACEMENT CHART





WINDOW INTERLOCK SWITCH (MOUNTED UPPER LEFT IN CABINET - REAR VIEW)

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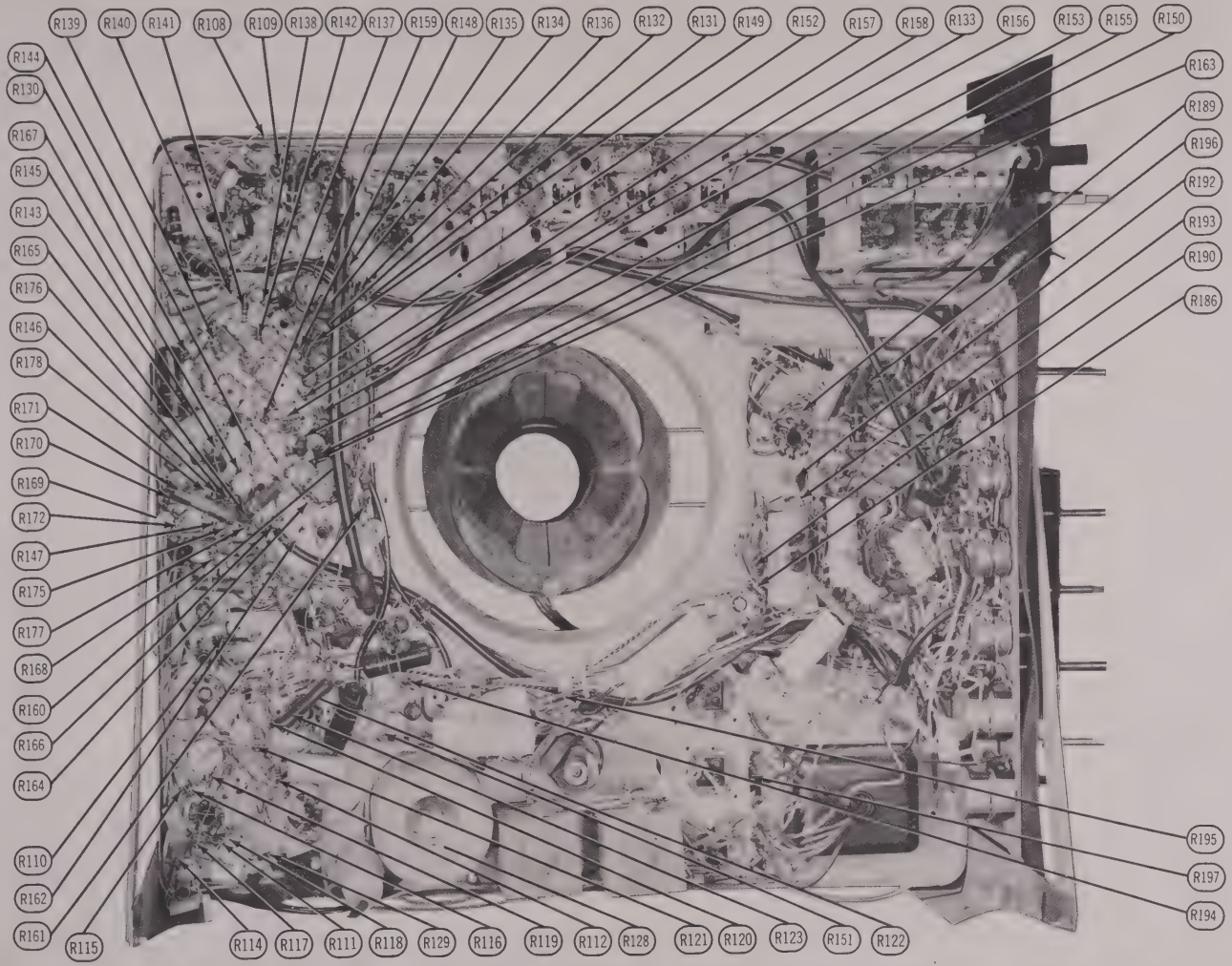
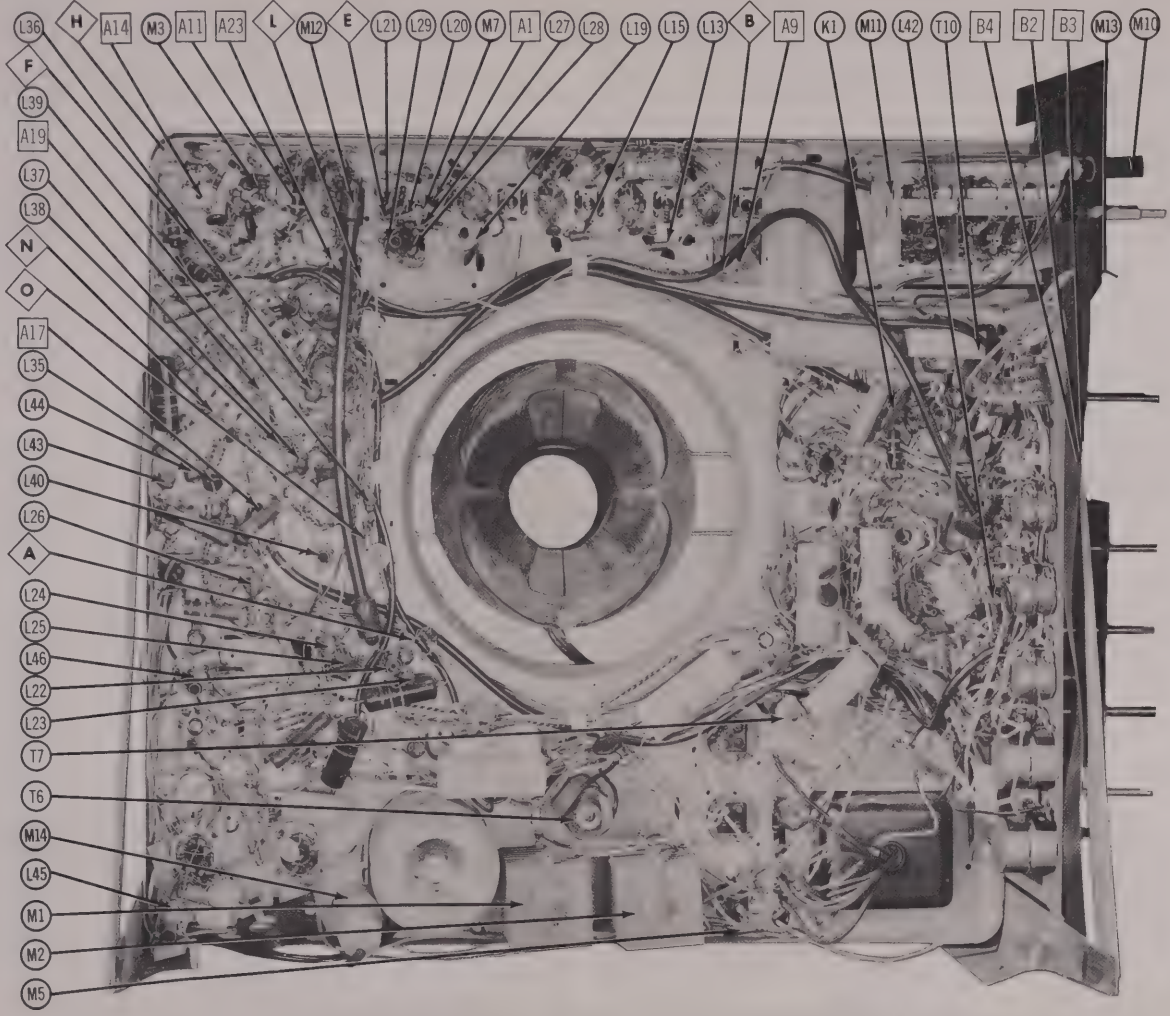
3924 MEADE ST.
DENVER, COLORADO

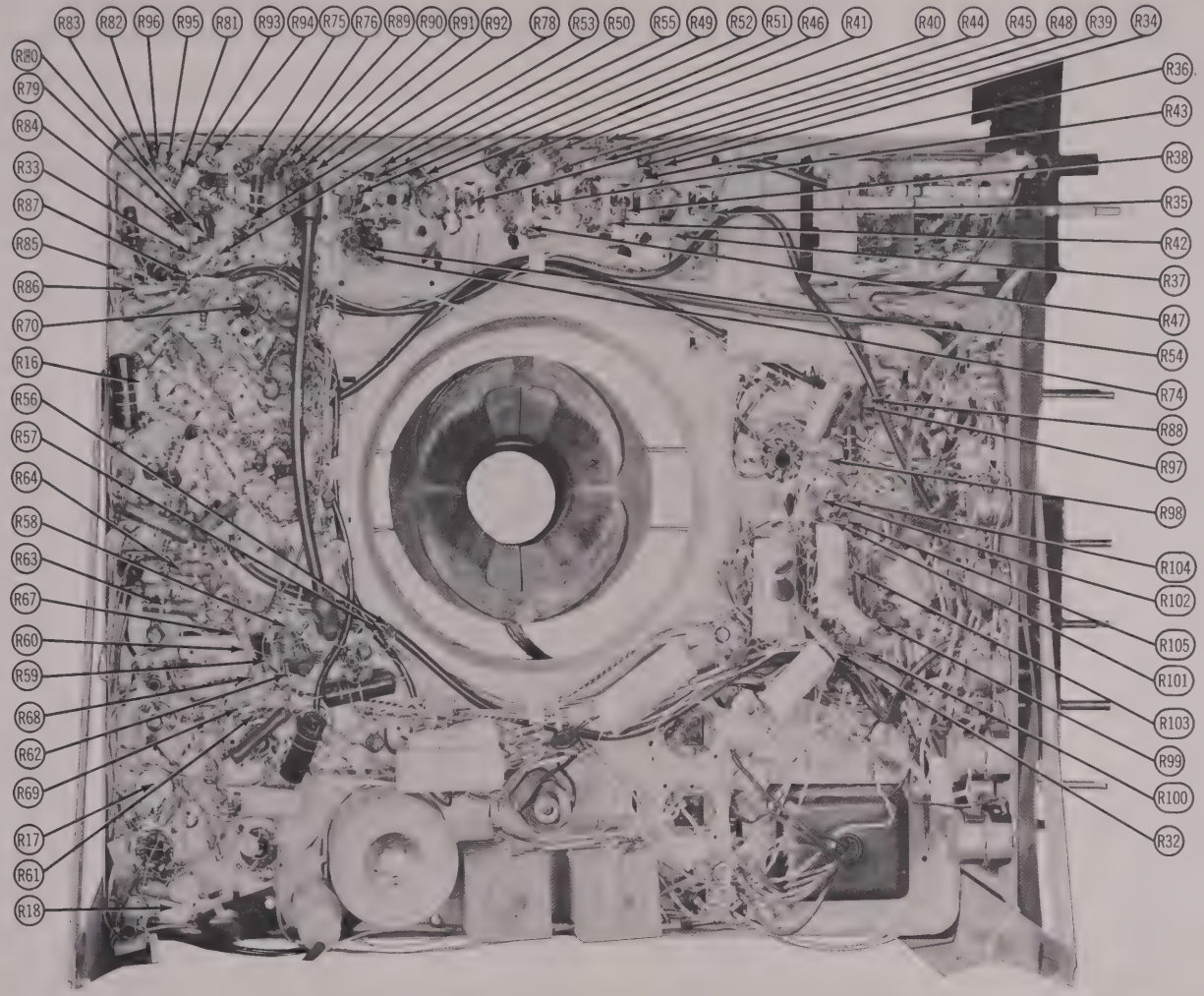


CHASSIS BOTTOM VIEW RESISTOR IDENTIFICATION (R109-R197)

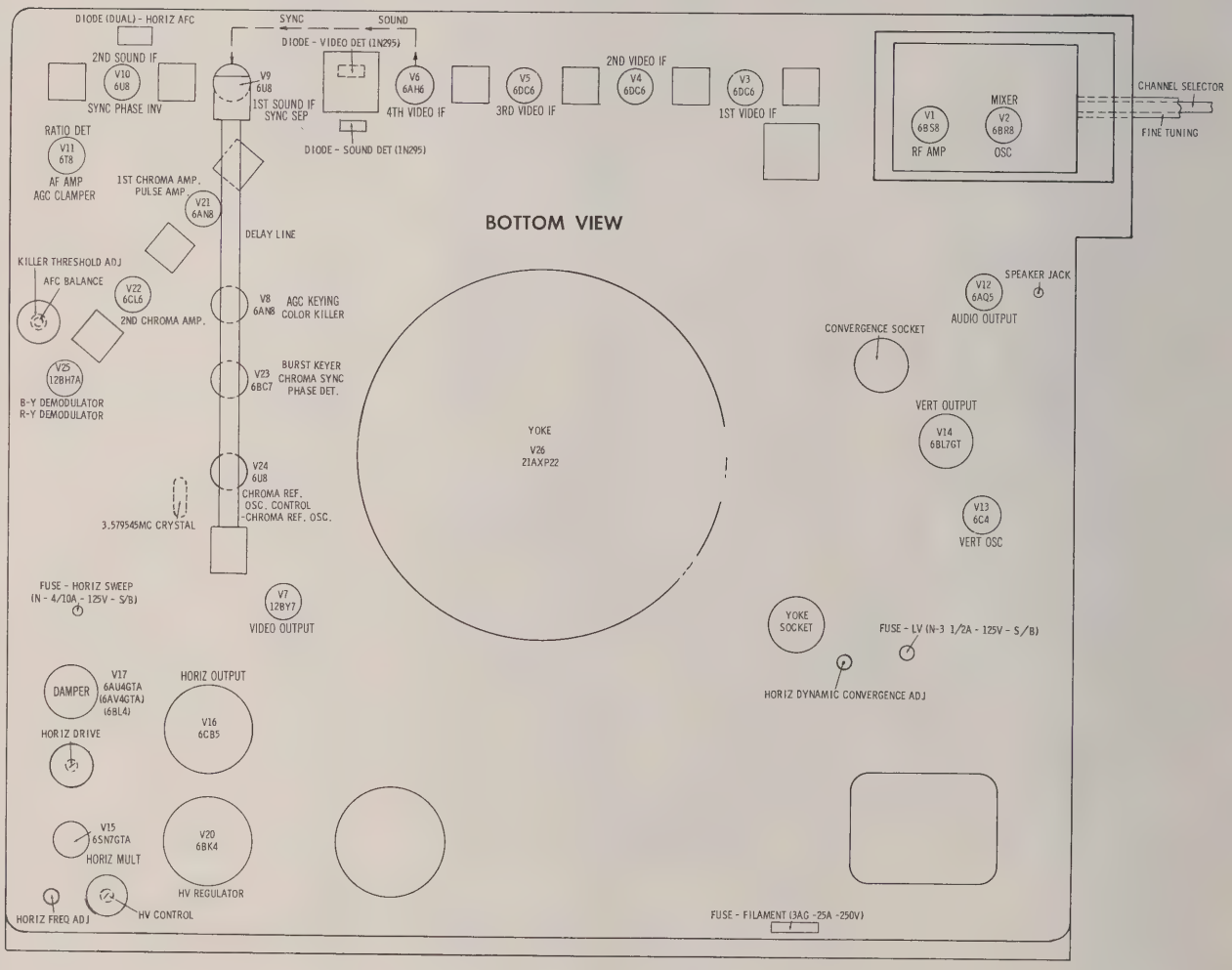


CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION

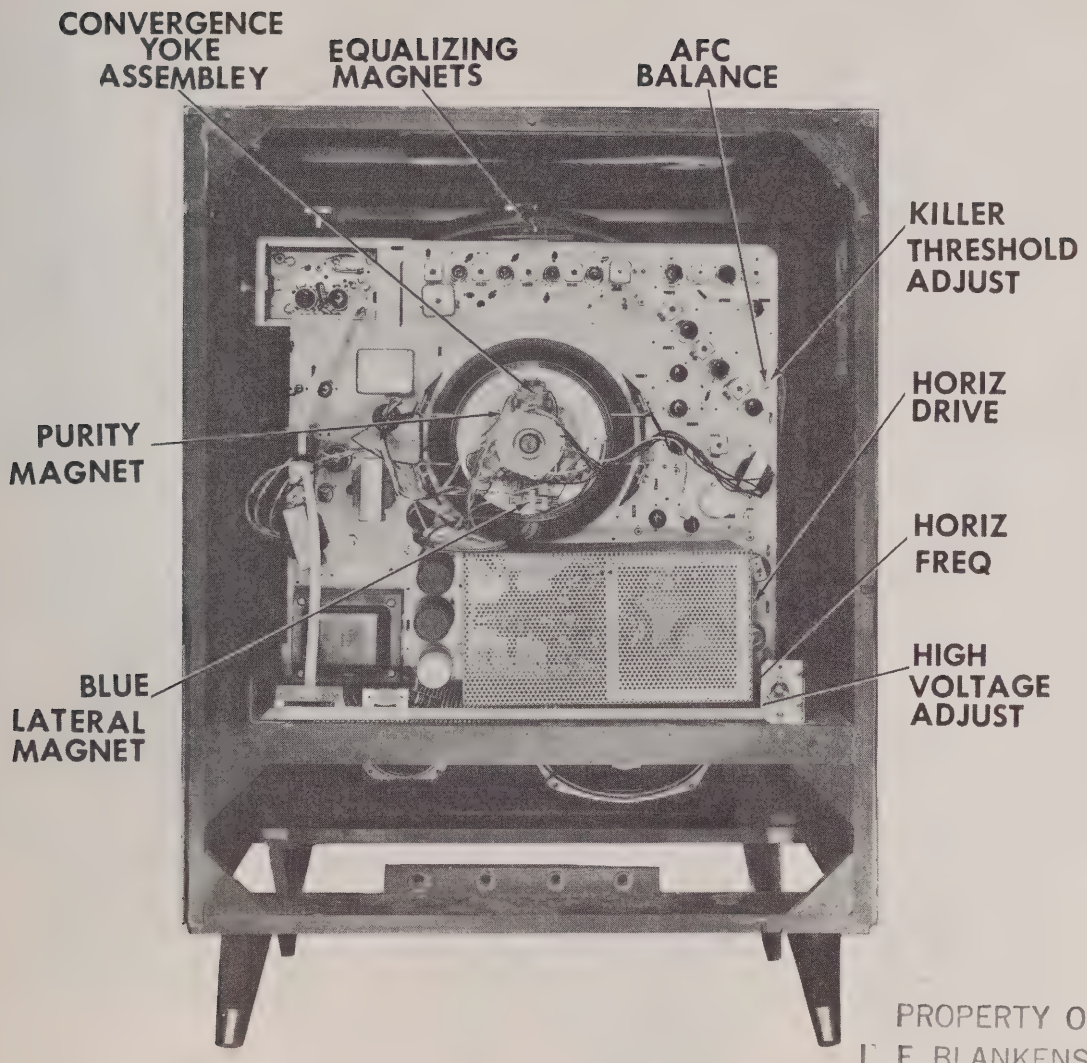
PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



CHASSIS BOTTOM VIEW RESISTOR IDENTIFICATION (R16-R105)



TUBE PLACEMENT CHART



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

CABINET—REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 8 push-on type knobs from the side.

2. Remove 8 wood screws holding the side escutcheon. Remove the escutcheon and 2 push-on type tuning knobs.

3. Remove 7 wood screws along the bottom edge of the rear cover, loosen 5 wood screws along the top and sides of the rear cover. Pull the cover out at the bottom and slide up to remove.

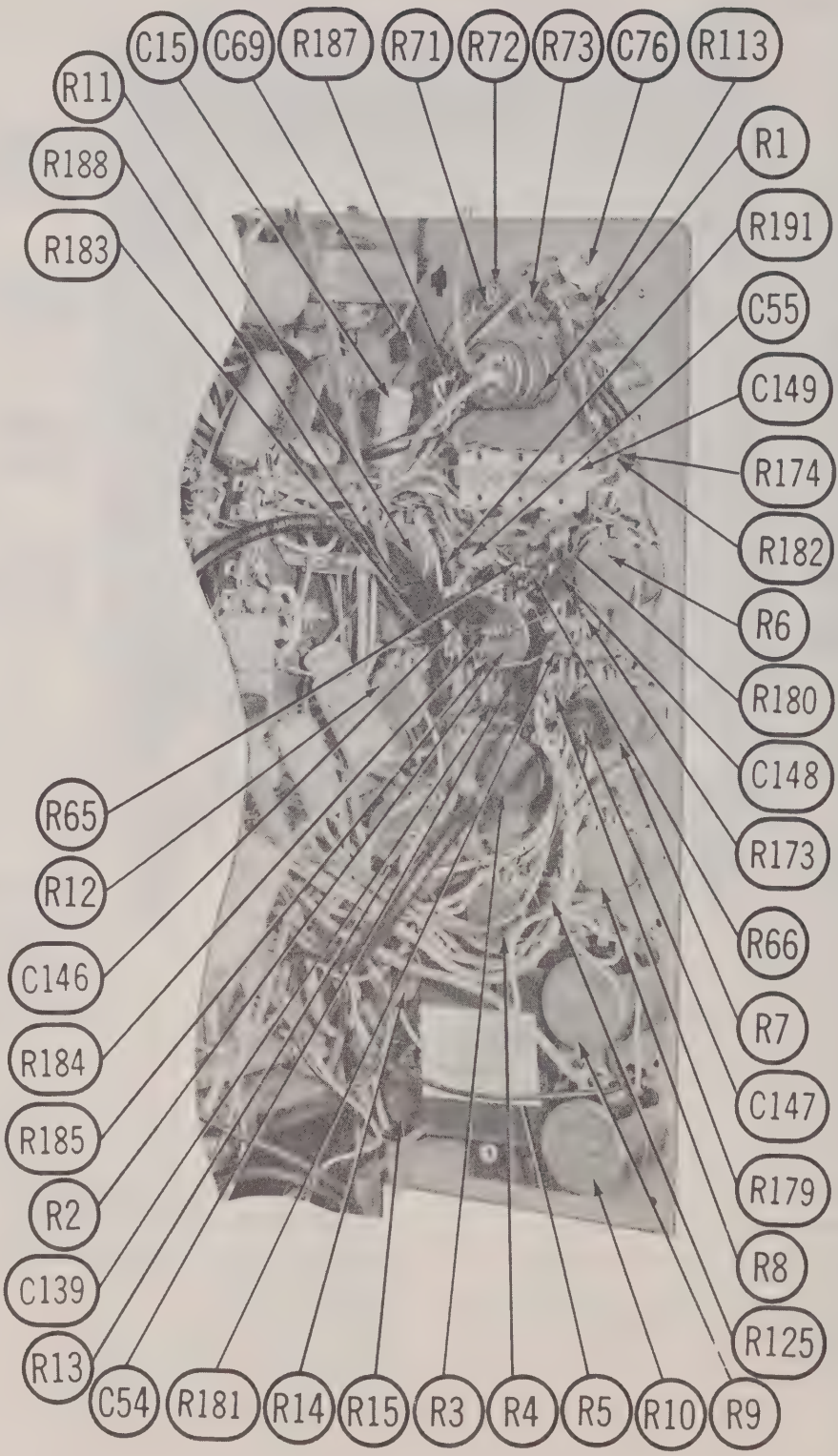
4. Remove 6 wood screws from the trim strip at the top edge of the safety glass. Remove the trim strip. Tilt safety glass and mask out at the top and lift up to remove.

5. Remove 2 bolts from the AC interlock switch at the top edge of the safety glass.

6. Remove speaker leads.

7. Remove 6 chassis bolts from the bottom.

8. Remove the chassis.



CONTROL PANEL-REAR VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BS8	
V2	Mixer-Osc.	6BR8	
V3	1st. Video IF Amp.	6DC6	
V4	2nd. Video IF Amp.	6DC6	
V5	3rd. Video IF Amp.	6DC6	
V6	4th. Video IF Amp.	6AH6	
V7	Video Output	12BY7	
V8	AGC Keying-Color Killer	6AN8	
V9	1st. Sound IF Amp.-Sync Sep	6U8	
V10	2nd. Sound IF - Sync Phase Inv.	6U8	
V11	Ratio Det.-AF Amp.- AGC Clamper	6T8	
V12	Audio Output	6AQ5	
V13	Vert. Osc.	6C4	
V14	Vert. Output	6BL7GT	

ITEM No.	USE	TYPE	NOTES
V15	Horiz. Mult.	6SN7GTA	
V16	Horiz. Output	6CB5	
V17	Damper	6AU4GTA	Note 1
V18	Focus Rect.	1X2B	
V19	HV Rectifier	3B2	Note 2
V20	HV Regulator	6BK4	
V21	1st. Chroma Amp.- Pulse Amp.	6AN8	
V22	2nd. Chroma Amp.	6CL6	
V23	Burst Keyer-Chroma Sync Phase Det.	6BC7	
V24	Chroma Ref. Osc. Control- Chroma Ref. Osc.	6U8	
V25	B-Y Demodulator- R-Y Demodulator	12BH7A	

Note 1. A 6BL4 or 6AV4GTA may be used in some versions.
Note 2. A 3C2 may be used in some versions.

PICTURE TUBE

ITEM No.	REPLACEMENT DATA			NOTES
	SILVERTONE PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V26	21AXP22	21AXP22 21AXP22A	21AXP22 21AXP22A	

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	200	250	18-27-3	AFHS1-37-30	XA0318	FP126	TMS-75	Q-012 MT-2540	TVL-1547
C2	200	250	18-27-3	AFHS1-37-30	XA0318	FP126	TMS-75	Q-012 MT-2540	TVL-1547
C3	1000	12	18-36-0	PRS12V1000	BR10001	TC1501	TD-1000-15	S-020	TVA-1133
C4A	▲90	450	18-23-3	AFH2-94-85	XA0318	FP126			R2470 *
B	▲200	250			BR10045	TC80			
C5	2	50	18-30-0	PRS50V2	BBR2-50	TC302	TD-2-50	MT-0502	TVA-1301
C6	10	50	18-33-0	PRS50V10	BBR10-50	TC32	TD-10-50	MT-0510	TVA-1304
C7A	▲10	450	18-22-3	AFH4-10	D0090	FP434	TMQ-10	Q-030	TVL-4760
B	▲10	450							
C	■10	450							
D	10	450							
C8	4	450	18-32-0	PRS450V4	BR445	TC70	TD-4-450	MT-4504	TVA-1702
C9	4	50	18-25-0	PRS150V4	BBR4-50	TC30	TD-4-50	MT-0504	TVA-1303
C10	4	50	18-25-0	PRS150V4	BBR4-50	TC30	TD-4-50	MT-0504	TVA-1303
C11	25	50	18-34-0	PRS50V25	BBR25-50	TC36	TD-25-50	MT-0525	TVA-1306
C12	10	25NP	18-6-5	NP-PRS25V10	BBR20-25 † BBR20-25	TC45 † TC45 †	TD-20-150 † TD-20-150 †	MT-1520 † MT-1520 †	R2463 *
C13	10	50	18-33-0	PRS50V10	BBR10-50	TC32	TD-10-50	MT-0510	TVA-1304
C14	500	12NP	18-31-0	NP-PRS10V500	BR10001 † BR10001	TC1501 † TC1501 †	TD-100015 † TD-100015 †		R2464 *
C15	10	25	18-35-0	PRS25V10	BBR10-25	TC22	TD-10-25	MT-0210	TVA-1204

* Non-catalog item.
† Connect negative leads together.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C16	4.0		225-409							N750 10%
C17	1000		244-1	EF-001	MFT-1000				503C-D1	
C18	2.0		2310-209			C10V2C				
C19	9.0		245-909			C10V9C				NPO 10%
C20	1000		244-1	EF-001	MFT-1000				503C-D1	
C21	.3		2101-303							
C22	.27		2101-278							
C23	1.0		2101-109	NPO-SI 1.0	TCZ-1		TCO-1		5TCCB-V1	
C24	47		233-470	N750-SI 47	TCN-47	C10Q47U	TC7-47		5TCU-Q47	N750 5%
C25	1000		244-1	EF-001	MFT-1000				503C-D1	
C26	1000		2033-23	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C27	10		221-100	N750-SI 10	TCN-10	C10Q1U	TC7-10	NT-541	5TCU-Q1	N750 10%
C28	1.5		246-159							N750 5%
C29	100		248-101							N750 10%
C30	2.0		2101-209			C10V2C				
C31	10		163-100	NPO-SI 10	TCZ-10	C10Q1C	TCO-10	ZT-541	5TCC-Q1	NPO 5%
C32	1.5		170-159							N750
C33	1000		244-1	EF-001	MFT-1000				503C-D1	
C34	62		246-620							N750 5%
C35	1000		244-1	EF-001	MFT-1000				503C-D1	
C36	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C37	1000		15-10217	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C38	680		15-68117	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C39	20000		15-20317	BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	①
C40	680		15-68117	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C41	1500		15-15217	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C42	1500		15-15217	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C43	680		15-68117	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C44	1500		15-15217	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C45	680		15-68117	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C46	1500		15-15217	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C47	680		15-68117	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C48	1500		15-15217	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C49	680		15-68117	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C50	1500		15-15217	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C51	1500		15-15217	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C52	680		15-68117	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
C53	200			N750-SI 200	TCN-200	C10V2U	TC7-200		5TCU-T2	N750 10%

CAPACITORS (cont)

ITEM No.	RATING CAP	RATING VOLT	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C54	1500		15-49217	BPD-0015	DD-152	BYA1001S	ED-1500	DC5216	5HK-G15	
C55	4000		15-49216	BPD-004	DD-402	BYA1J04	ED-004	UC-524	5GA-D4	
C56	6.8	5	15-49831	MPO-6S 6.8	TCZ-6R8	CM09R8C	TCD-6.8	ZT-5S68	5TCCB-V6S	NPO 0%
C57	10		15-10014	NT50-S1 10	TCN-10	CD06L	TCT-10	NT-541	5TCU-Q	NT50 10%
C58	47		15-47016	NPO-S1 47	TCZ-47	CD06P47	TCD-47	ZT-5447	5TCC-Q47	NPO
C59	82		15-47014		TCN-82	CD06Q82	TCT-82			NT50 10%
C60	27				TCZ-27	CD06Z7C	TCD-27			
C61	68									NPO 5%
C62	3300			BPD-005	DD-503	BYA10D5	ED-005	DC535	5HK-D5	
C63	10000		15-10317	BPD-01	DD-103	BYA5S1	ED-01	DC5S1	5HK-S1	
C64	56	4000								
C68A	5000	1000	15-50229	HVD-15-4700	DD30-502	BYA10D5	HK85-4700		5HL-D50	
B	5000	1000		HVD-15-4700	DD30-502	BYA10D5	HK85-4700		5HL-D50	
C66	500		15-5611		DD-501		ED-500			10%
C67	1000		15-10211				ED-1000			10%
C68	.01	400	15-10348	P488N-01	D6-103	CUB4S1	GP-10000	GEM-4S1	4TM-S1	
C69	47	3000		BVD-30-47	DD30-470	HVA30Q47	HS5-47		20GAB-Q47	③
C70	.01	600	15-10317	P488N-01	D6-103	CUB4S1	GP-10000	GEM-4S1	4TM-S1	
C71	5	350	30-134	P286N-5		CUB2P5		GEM-205	2TM-P5	
C72	.1	600	15-10446	P488N-1	DF-104	CUB4P1		GEM-4S1	4TM-P1	
C73	3000	3000	15-49215	HVD-30-1000	DD30-102	BYA10D1	HK85-1000	DC5Q1	5HK-D1	
C74	470		17-47114	1454-000047		5R5T47			5MS-347	10%
C75	10000		15-10317	BPD-01	DD-103	BYA5S1	ED-01	DC5S1	5HK-S1	
C76	10000		15-10317	BPD-01	DD-103	BYA5S1	ED-01	DC5S1	5HK-S1	
C77	.1	600		P488N-1	DF-104	CUB4P1		GEM-4S1	4TM-P1	③
C78	.01	600	15-10348	P488N-01	D6-103	CUB4S1	GP-10000	GEM-4S1	4TM-S1	
C79	330		15-5311		DD-331	L10T33	ED-330			10%
C80	10000		15-10317	BPD-01	DD-103	BYA5S1	ED-01	DC5S1	5HK-S1	
C81	.0047	600	15-47350	P488N-047	DF-503	CUB2S47		GEM-4147	4TM-S47	
C82	.01	400	15-10348	P488N-01	D6-103	CUB4S1	GP-10000	GEM-4S1	4TM-S1	
C83	.01		15-10325	BPD-001	DD-103	BYA6S1	ED-1000	DC5Q1	5HK-D1	
C84	35	600	30-36-1	P688N-25		CUB6P35		GEM-6025	6TM-P25	
C85	.047	600	30-34-1							10%
C86	.033	600	30-37-1							10%
C87	10000		30-19-0	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C88	1000		15-10221				ED-1000			10%
C89	1000		15-10221				ED-1000			10%
C90	5000		15-50211							10%
C91	.047	300	15-47238	P388N-047	DF-503	CUB2S47		GEM-4147	2TM-S47	
C92	330		17-33113	1465-00033		5R5T33			5MS-333	5%
C93	18		30-2-3			2DR5S18			5MS-318	5%
C94	3900			1467-00039		5R5D39			1TM-239	
C95	470		17-47114		D6-471	L10T47	ED-470		M5-347	10%
C96	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C97	.1	600	15-10488	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C98	1000	3000								
C99	33	1000	30-36-1	P1088N-25		CUB10P25			10TM-P25	
C100	.1	1000	30-35-1	P1088N-1		CUB10P1			10TM-P1	
C101	180	6000	15-13518							N5S90 10%
C102	.25	1000	30-36-1	P1088N-25		CUB10P25			10TM-P25	
C103	.1	600	30-134	P288N-5		CUB2P5		GEM-205	2TM-P5	
C104	1200	15000	30-9-0							
C105	1200	15000	30-9-0							
C106	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C107	3500	30000	30-11-0							
C108	1000		15-10326	BPD-001	DD-102	BYA5S1	ED-1000	DC5S1	5HK-D1	
C109	1000		15-10221				ED-1000			10%
C110	1000		15-10221				ED-1000			10%
C111	20000		15-30317	BPD-03	DD-303	BYB6S2	ED-03		5HK-S3	①
C118A	5000	1000	15-50229	HVD-15-4700	[illegible]	BYA10D5	HK85-4700		5HL-D50	
B	5000	1000		HVD-15-4700	[illegible]	BYA10D5	HK85-4700		5HL-D50	
C113	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C114	560		17-54114	1464-00056		5R5T56			M5-356	10%
C115	100-560		19-174-0							
C118	.1	600	15-10488	P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C119	15		15-15014	NT50-S1 15	TCN-15	CD06S15	TCT-15		5TCU-Q15	NT50 10%
C120	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C121	20000		15-30317	BPD-03	DD-303	BYB6S2	ED-03		5HK-S3	
C122	100		15-10114	NT50-S1 100	TCN-100	CD07U	TCT-100	NT-551	5TCU-T1	NT50 10%
C123	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C124	1000					5W5T47			1TM-347	10% ③
C125	47	3000		BVD-30-47	DD30-470	HVA30Q47	HS5-47		20GAB-Q47	
C127	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C128	1000		15-10211				ED-1000			10%
C129	5		15-50131	NPO-S1 5		CD05C	TCD-5	ZT-5S5	5TCCB-V5	NPO 10%
C130	.2	200	30-32-1	P288N-.2		CUB2P2		GEM-3032	2TM-P2	
C131	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C132	2.2		15-22R31	NPO-S1 2.2	TCZ-2R2	CD06V22C	TCD-2.2		5TCCB-V22	NPO 5%
C133	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C134	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C135	220		15-5211		DD-221	L10T22	ED-220			10%
C136	82		15-82041							N75S 10%
C137	33		15-33013	NPO-S1 33	TCZ-33	CD06Q33C	TCD-33	ZT-5S33	5TCC-Q33	NPO 5%
C138	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C139	47		15-47114	NT50-S1 47	TCN-47	CD06T47	TCT-47	NT-5447	5TCU-Q47	NT50 10%
C140	20000		15-30317	BPD-03	DD-303	BYB6S2	ED-03		5HK-S3	
C141	27		15-27011			CD02Z7C				NPO 10%
C142	100		15-10114	NT50-S1 100	TCN-100	CD07U	TCT-100	NT-551	5TCU-T1	NT50 10%
C143	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C144	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C145	10000		15-10317	BPD-01	DD-103	BYA6S1	ED-01	DC5S1	5HK-S1	
C146	10000	2000	15-10337						BL-S10	
C147	10000	2000	15-10337						BL-S10	
C148	10000	2000	15-10337						BL-S10	
C149A	25-280									
B	25-280		19-166-0							
C	25-280									
C150	1200	1000	30-30-0							10%
C151	2200	1000	30-30-0							10%
C152	2200	1000	30-30-0							10%
C153	25	600	30-32-1							10%
C154	25	600	30-46-1	P68SN-25		CUB6P25		GEM-6025	6TM-P25	
C155	047	600	30-64-1	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	
C156	047	600	30-64-1	P688N-047	DF-503	CUB6S47		GEM-6147	6TM-S47	

① Some versions may use a 10000mmf (Part #15-10317) in this application.
② Not used in some versions.
③ Not used in Chassis 528, 46300.
④ Chassis 528 46301 uses a 470mmf NPO 10% (Part #15-47114) in this application.

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING OHMS	RATING WATTS	REPLACEMENT DATA SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	500K		25-97	F1-40			UJ571	Brightness
B	Imeg			R3-41				Volume
C	Switch			S1-3			UE3747B	
R2A	500Ω		25-96					Contrast Tap @ 200Ω
							UE3748	with 100Ω stop
B	1000Ω							Color Contrast
R3A	1000Ω		25-96	R-8	A4T-1000-S	QJ-108	U4	Hue
B	Shaft			Not Req.	7S-3	Not Req.		
R4A ④	Imeg		25-64	F1-51				Vert. Hold
B	10K			R3-33			UE3748	Horiz Hold
R5	7.5meg	1	25-84					Focus
R6A	500K		25-94	F1-40			UE3750	Blue Grid
B	500K			R3-40				Blue Screen
R7A	500K		25-94	F1-40			UE3750	Green Grid
B	500K			R3-40				Green Screen
R8A	5meg		25-98	F1-47			UE3752	Vert Height
B	1000Ω			R3-4				Vert Linearity
R9A	3000	2(WW)	25-89			WP6300	Not Req.	Vert. Centering
B	300Ω	2(WW)				WM300	Not Req.	Vert Centering
R10A	100Ω	2(WW)	25-70			WP6100	UE3149	Horiz Centering
B	100Ω	2(WW)				WM100	Not Req.	Horiz. Centering
R11A	30000		25-86	F1-9			UE3753	Red Vert. Parab - Note 1
B	1000Ω			R3-4				Red Vert Tilt- Note 1
R12A	30000		25-86	F1-9			UE3753	Green Vert. Parab - Note 1
B	1000Ω			R3-4				Green Vert Tilt - Note 1
R13A	30000		25-86	F1-9			UE3752	Blue Vert. Parab - Note 1
B	1000Ω			R3-4				Blue Vert. Tilt - Note 1
R14A	10000		25-87	F1-4			UE3753	Green Horiz. Parab
B	1000Ω			R3-4				Red Horiz. Parab
R15A	1000Ω		25-68	AB-5	A4T-1000-S	QJ-108	U4	Blue Horiz. Parab
B	Shaft			AK-1	7S3-1/4	BQ	Not Req.	
R16A	100K		25-83	F1-31			UE3754	Killer Threshold Adjustment
B	100K			R3-32				AFC Balance
R17A	30000		25-85	AB-10	A4T-5000-S	QJ-114	U14	Horiz. Drive - Note 2
B	Shaft			AK-1	7S3-1/4	BQ	Not Req.	
R18A	500K		25-93	AB-59	A4T-500K-S	QJ-132	U50	High Voltage Adjustment - Note 3
B	Shaft			AK-1	7S3-1/4	BQ	Not Req.	

Note 1. Some versions of chassis 528 46300 may use part #25-56 in this application.
Note 2. Some versions may use alternate part #25-97 in this application.
Note 3. Some versions may use alternate part #25-96 in this application.
◆ Concentrikit® Equivalent K-4 Kit, Base Elements & Shafts Kit-133, P1-220 (Panel)
Kit-137, R2-300 (Rear)
78-1 (Switch)

◆◆ STA-LOC Equivalent FD65L, CS2562, RU18L, IS3000, UR-41
◆◆ STA-LOC Equivalent FC67T23S, CS2563, RU18L, IS3000.
* Concentrikit® Equivalent K-4 Kit, Base Elements & Shafts Kit-137, P1-220 (Panel)
Kit-108, R2-300 (Rear)

** STA-LOC Equivalent FA16L, CS2562, RU14L, IS3000
† Concentrikit® Equivalent K-2 Kit, Base Elements & Shafts Kit-133, P1J-024 (Panel)
Kit-133, R1S-017 (Rear)

†† STA-LOC Equivalent FB55L, CS2560, RU16S, IKS2S.
▲ Concentrikit® Equivalent K-3 Kit, Base Elements & Shafts Kit-138, P1J-034 (Panel)
Kit-108, R1S-017 (Rear)

== STA-LOC Equivalent FB26L, CS2750, RU13L, IKS2S.
=== Use 5/8" shaft for more exact replacement.
▲ Concentrikit® Equivalent K-3 Kit, Base Elements & Shafts Kit-110, P1J-024 (Panel)
Kit-108, R1S-017 (Rear)

▲▲ STA-LOC Equivalent FB23T, CS2750, RU13L, IKS2S.
Concentrikit® Equivalent K-2 Kit, Base Elements & Shafts Kit-108, P1J-024 (Panel)
Kit-108, R1S-017 (Rear)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	SILVERTONE PART No.	NOTES
R19	100K		111-104	
R20	2200 5%		101-222	
R21	2700 5%		101-272	
R22	1.2meg		126-125	
R23	150K		101-154	
R24	4700Ω		106-472	
R25	220K		111-224	
R26	15K 5%		101-153	
R27	360 5%		101-360	
R28	5600Ω		106-222	
R29	5600Ω		106-562	
R30	15K		106-153	
R31	3000Ω	5	64-74	Note 1
R32	6500Ω	5	61-24	Note 2
R33	1.5meg		60-15501	Note 3
R34	5600Ω		60-56201	
R35	8200Ω		60-82201	
R36	3700Ω	1	60-37201	
R37	47Ω		60-47001	
R38	22K		60-22301	
R39	470Ω		60-47101	
R40	47K		60-47301	
R41	2700Ω	1	60-27211	
R42	47Ω		60-47001	
R43	47K		60-47301	
R44	470Ω		60-47101	
R45	47K		60-47301	
R46	2700Ω	1	60-27211	
R47	47Ω		60-47001	
R48	1800Ω		60-18201	
R49	18Ω		60-18001	
R50	470Ω		60-47101	
R51	15K		60-15301	
R52	150Ω		60-15101	
R53	470K		60-47401	
R54	5600Ω		60-56201	
R55	4700Ω		60-47201	Note 2
R56	8200Ω		60-82201	
R57	8200Ω		60-82201	
R58	47K		60-47301	Note 2
R59	33K		60-33301	
R60	6500Ω	5	61-24	
R61	120K	1	60-12141	
R62	33K		60-33301	
R63	15K	3	61-80	
R64	3900Ω	3	61-59	
R65	47Ω		60-47001	
R66	560Ω		60-56101	
R67	56K		60-56301	
R68	47K		60-47201	
R69	56K		60-56301	
R70	10K		60-10301	
R71	220K		60-22401	Note 4
R72	270K		60-27401	Note 4
R73	47000Ω		60-47201	
R74	470K		60-47401	
R75	10K	1	60-10311	
R76	82Ω		60-82001	
R77	8200Ω			
R78	100K		60-10401	
R79	15K		60-15301	
R80	27K		60-27301	
R81	100Ω		60-10301	
R82	220Ω		60-22101	
R83	68K		60-68301	
R84	15K		60-15301	
R85	10meg		60-47301	Note 5
R86	47K		60-47301	Note 5
R87	8.2meg		60-82501	Note 5
R88	47K		60-47301	Note 5
R89	470K		60-47401	
R90	2.7meg		60-27501	
R91	150K		60-15401	
R92	39K		60-39301	
R93	Imeg		60-10501	
R94	3300Ω		60-33201	
R95	470Ω		60-47101	
R96	3300Ω		60-33201	
R97	68K		60-68301	
R98	680K		60-68401	
R99	1.2meg		60-12501	
R100	56K		60-56301	
R101	100Ω		60-10101	
R102	2.2meg		60-22501	
R103	15K		60-15301	
R104	470Ω		60-47101	

RESISTORS (cont)

ITEM No	RATING OHMS	RATING WATT	SILVERTONE PART No	NOTES
R105	100Ω		60-10101	
R106	1000Ω		60-10201	
R107	10000Ω		60-10301	
R108	100K		60-10401	
R109	100K		60-10401	
R110	120Ω		60-12101	
R111	470K		60-47401	
R112	4.7meg		60-47501	
R113	680Ω		60-68101	
R114	56000 5%	1	60-56215	
R115	18000 5%		60-18205	
R116	100K 5%		60-10405	
R117	120K 5%		60-12405	
R118	47Ω		60-47001	
R119	12K		60-12301	
R120	100Ω		60-10101	
R121	470K		60-47401	
R122	13K	10	61-81	
R123	3.9Ω		60-39901	
R124	5.6meg	2	61-48	
R125	82meg	2	61-49	
R126	4.7Ω		60-47901	Note 7
R127	3300Ω	2	61-49	
R128	4.7Ω		60-47901	
R129	1meg		60-10601	
R130	470K		60-47401	
R131	330Ω		60-10301	
R132	56K	1	60-56311	
R133	10K		60-10301	
R134	12K		60-12301	
R135	3300Ω		60-33301	
R136	1meg		60-10601	
R137	10K		60-10301	
R138	470Ω		60-47101	
R139	470Ω	1	60-47111	
R140	3500Ω	5	61-67	
R141	33000		60-33301	
R142	100Ω		60-10101	
R143	10K	2	60-10321	
R144	10K		60-10301	
R145	3300Ω	3	61-58	
R146	2700Ω		60-27301	
R147	100K		60-10401	
R148	680Ω		60-68101	
R149	4.7meg		60-47501	
R150	220Ω	1	60-30111	
R151	15K		60-15301	
R152	18000		60-18201	
R153	470Ω 5%		60-47403	
R154	3.3meg		60-33501	
R155	15meg		60-15601	
R156	4.7meg		60-47501	
R157	470K 5%		60-47405	
R158	10K		60-30111	
R159	150K		60-15401	
R160	22000		60-32301	
R161	15K		60-15301	
R162	470Ω		60-47101	
R163	18000		60-18201	
R164	100K		60-10401	
R165	15K	3	61-80	
R166	10K		60-10301	
R167	10K		60-10301	
R168	150K		60-15401	Note 6
R169	100K		60-10401	
R170	270Ω		60-27101	
R171	39K	10	61-36	
R172	150K		60-15401	Note 9
R173	82K		60-82301	
R174	150K		60-15401	Note 10
R175	100K		60-10402	
R176	27000		60-27301	
R177	56K	2	61-61	
R178	22K	2	60-22321	
R179	47K		60-47301	
R180	56K		60-56301	
R181	100K	1	60-10411	
R182	47K		60-47301	
R183	47K		60-47301	
R184	470K		60-47401	Note 11
R185	100K		60-10509	
R186	47K		60-47301	
R187	470K		60-47401	Note 10
R188	56K		60-56301	
R189	470Ω		60-47101	
R190	68K		60-68301	
R191	68K		60-68301	
R192	100Ω		60-10201	
R193	10000		60-10301	
R194	10K		60-10301	
R195	1000Ω		60-10211	
R196	220Ω	1	61-57	
R197	56K	1	60-56311	

Note 1. Chassis 528 46300 uses a 3300Ω 1W (Part #60-33211) in this application.
Note 2. Not used in Chassis 528, 46300.
Note 3. Chassis 528 46300 uses a 1.5meg (Part #60-12501) in this application.
Note 4. Some versions may use a single 130K to replace R71 and R72.
Note 5. Chassis 528 46300 uses a 100K (Part #60-10401) in this application.
Note 6. Chassis 528 46300 uses a 1meg (Part #60-10601) in this application.
Note 7. Chassis 528, 46300 uses a 1.2Ω (Part #60-12901) in this application.
Note 8. Chassis 528, 46300 uses a 270K (Part #60-27401) in this application.
Note 9. Chassis 528, 46300 uses a 390K (Part #60-39401) in this application.
Note 10. Chassis 528, 46300 uses an 82K (Part #60-82301) in this application.
Note 11. Chassis 528, 46300 uses a 560K (Part #60-56401) in this application.

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ 1A	175V tap @ 165V @ 480A	6.3V @ 1A	5.3V @ 14A	80-372					

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Rim PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	Vert. Osc	B80-371	B6701	A-4003	V402	A-8122	26A04	A-97V	
	Alt. Vert. Osc.	80-372							
T3	Vert. Output	B80-393-C	Z1900 ①	A-3823	V307	A-8143 ②	36S72	A-108X	
	Alt Vert Output	80-352							
T4A	Yoke-Horiz (12MAH)	10-800							
B	Vert. (42MH each wdg.)								
T5	Horiz. Output	D80-364F							
	Alt. Horiz. Output	80-364C							
T6	Horiz. Centering Isolation Choke	B33-249							
	Alt. Horiz. Centering Isolation Choke	33-249							
T7	Horiz. Conv. Amplitude Coil (4-1. 9MH)	10-32-1	RF804	MWC-16 ③	20UR13A	WC-7	WC-33 ③		
	Alt. Horiz. Conv. Amplitude Coil	10-744							
T8	Vert. Conv. Isolation Choke	A80-355							
	Alt. Vert. Conv. Isolation Choke	80-355							
T9	Conv. Choke Assy.	C10-805							

① Use 8 to 1 turns ratio.
② Drill new mounting hole(s).
③ Do not use.
④ Enlarge mounting hole.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T10	5700Ω	3-4Ω	80-353	Z1110 ①	A-3019	A-8092	26S49	S-5Z	① Drill new mounting hole.

SILVERTONE MODELS 7138, 7140, 7142 (Ch. 528.46300, 528.46301)

FOLDER 1

PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SILVERTONE PART No.	QUAM PART No.	
SP1	6"x 9"	PM	6-8Ω	79-454 ① ②	6A31Z7. 9②	① Used in Models 7140, 7142
SP2	4"	PM	6-8Ω	79-456 ① ②	4A07Z8. 5②	② Parallel and phase.
	6"	PM	3-4Ω	74-461 ③		③ Used in Model 7138

COILS (RF-IF)

ITEM No.	USE	SILVERTONE PART No.	NOTES	ITEM No.	USE	SILVERTONE PART No.	NOTES
L1	Ant. Trans.	2309-2		L6	RF Coil	301-25	Channel 13
L2	Ant. Coil	310-9	Channel 13	L7	Mixer Grid Coil	301-6	Channel 13
L3	Ant. Coil	300-6	Channel 13	L8	Osc. Coil	5381-6	Channel 13
L4	Neut. Coil	301-6		L9	Osc. Coil	5381-4	Channel 6
L5	RF Coil	301-8	Channel 13	L10	Mixer Plate Coil	2110-9	

ITEM No.	USE	REPLACEMENT DATA				NOTES
		SILVERTONE PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	
L11	1st. Video IF	10-16-2				Includes Cap.
L12A	41. 25MC Trap	10-12-0				Includes 470Ω resistor
B	47. 25MC Trap					
L13	Fil. Choke	33-246	19-1001	BC-562	4604	1. 5 Microhenries
L14	2nd. Video IF	10-17-2	17-5004	TV-126	6234	
L15	Fil. Choke	33-246	19-1001	BC-562	4604	1. 5 Microhenries
L16	3rd. Video IF	10-18-2	17-5004	TV-126	6234	
L17	4th. Video IF	10-31-2	17-5004	TV-126	6234	
L18	5th. Video IF	10-30-2				Includes Det. Assy.
L19	41. 25MC Trap	10-5-0				
L20	Series Peaking Coil	10-37-1				4. 7 Microhenries
L21	Series Peaking Coil	10-35-1	19-4201	TV-197	6154	200 Microhenries
L22A	3. 58MC Trap	10-33-1				
B	Series Peaking Coil		19-4201 *		6154 *	220 Microhenries, wound on 15K resistor
L23	Shunt Peaking Coil	10-30-1	19-3250	TV-185	6181	230 Microhenries
L24	Series Peaking Coil	10-73-1	19-3300	TV-200	6132	330 Microhenries
L25A	Peaking Coil	10-75-1	19-4412	TV-202	6136	443 Microhenries
B	Peaking Coil		19-4201	TV-197	6154	217 Microhenries
L26	Shunt Peaking Coil	10-67-1	19-3500 ▲	TV-203 ▲	6138 ▲	470 Microhenries, wound on 1500Ω resistor
L27	Shunt Peaking Coil	10-36-1	19-1005	BC-566	4612	10 Microhenries
L28	Series Peaking Coil	10-37-1				4. 7 Microhenries
L29A	4. 5MC Trap	10-6-0				Note 1
B	1st. Sound IF					
L30	2nd. Sound IF	10-21-2	17-3489	TV-113	6203	
L31	Ratio Det.	10-3-0	17-3498	TV-115	6205	
L32A	Bandpass Amplifier Grid Coil	10-69-1				Includes caps and resistor
B	4. 5MC Trap					
L33	Bandpass Amplifier Plate Coil	10-8-0				Includes 47K resistor
L34	Demod. Driver Plate Trans.	10-74-1				
L35	Series Peaking Coil	10-86-1	19-4950	TV-208	6157	1000 Microhenries
L36	Series Peaking Coil	10-72-1	19-3180	TV-184	6180	180 Microhenries
L37	Shunt Peaking Coil	10-70-1				27 Microhenries
L38	Burst Take-off Coil	10-31-1				Includes 10K resistor
L39	Series Peaking Coil	10-38-1	19-3036	TV-180	6176	39 Microhenries
L40	Chroma Ref. Osc. Control Plate Coil	10-34-1	17-6011 ♦			Includes 12mmf Cap.
L41	Chroma Ref. Osc. Plate Trans.	10-18-4				Includes Cap. and Resistor
L42	Series Peaking Coil	10-71-1	19-3036	TV-180	6176	33 Microhenries
L43	Series Peaking Coil	10-86-1	19-4950	TV-208		1000 Microhenries
L44	Series Peaking Coil	10-86-1	19-4950	TV-208		1000 Microhenries

* Parallel with 15K resistor.
▲ Parallel with 1500Ω resistor.
♦ The 12mmf cap. may have to be removed.
Note 1. Some versions may use Part #10-743 or #10-735 in this application.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SILVERTONE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	
L45	45Ω		10-19-4 ①					HS-7 *	Horiz. Freq., 20-88 Millihenries, includes 3900mmf cap.
L46	.2Ω	42Ω	10-29-1						Horiz. Phase

* Disregard tap.
① Alternate part #10-738.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L47	.340A	25Ω	1. 2 Hy.	33-245	C5041	C-2996	C-2328	26C93	
L48	.140A	23Ω	.8 Hy.	33-244	C5040	C-2994	C-2327	26C41	C-27X

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA	
K1	Vert. Integrator	2000mmf, 5000mmf, 5000mmf, 22K, 8200Ω, 8200Ω	13-2-0	Aerovox	PA-501
				Centralab	PC-104
				Cornell-Dubilier	115TM1
				Erie	1405-01
				Sprague	103C12

PARTS LIST AND DESCRIPTIONS (Continued)

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	SILVERTONE PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.480A	83-948 ①				609 ①	① Selenium type.
M2	.480A	83-948 ①				609 ①	② Two Required.
M3		48-110 ①	1215 ①②		1T1 ①②		

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			SILVERTONE PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M4	N	3½A 125V S/B	43-25 ①	84-2755 ①	33303.5 (N 3½A-125V-S/B)	346018	N 3½	HN 2½ to 3½
M5	3AG	25A 32V P/T	43-26 ②		311025. (3AG-25A-32V P/T)		AGC25	
M6	N	4/10A 125V S/B	43-21 ③	84-2372	333.400 (N-4/10A-125V-S/B)	346009	N 4/10	HN 3/10 to ½

① Alternate 4 A fuse and holder assembly (Part #84-2371) used in Ch. 528.46300.
② Not used in Ch. 528.46300.
③ Some versions of Ch. 528.46301 use a 3/10A Type N Slo/Blo (Part #43-24) in this application.

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		SILVERTONE PART No.	CBS PART No.	SYLVANIA PART No.	
M7	1N295	48-112	1N60	1N34A	Video Detector (Pigtail)
M8	1N295	48-112	1N60	1N34A	Chroma Detector (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M9	Crystal	48-77	3.579545MC
M10	Dial Lamp	89-7	#47
M11	Tuner	95-83	VHF
M12	Delay Line	23-172	
M13	Switch	69-221 ①	Safety glass interlock
M14	Switch	69-213	Hi-voltage Receptacle Interlock
M15	Magnet	83-947	Equalizing (6 used)
M16	Magnet	83-899	Blue Lateral Beam Positioning
M17	Magnet	83-944	Purity

① Not used in chassis 528.46300.

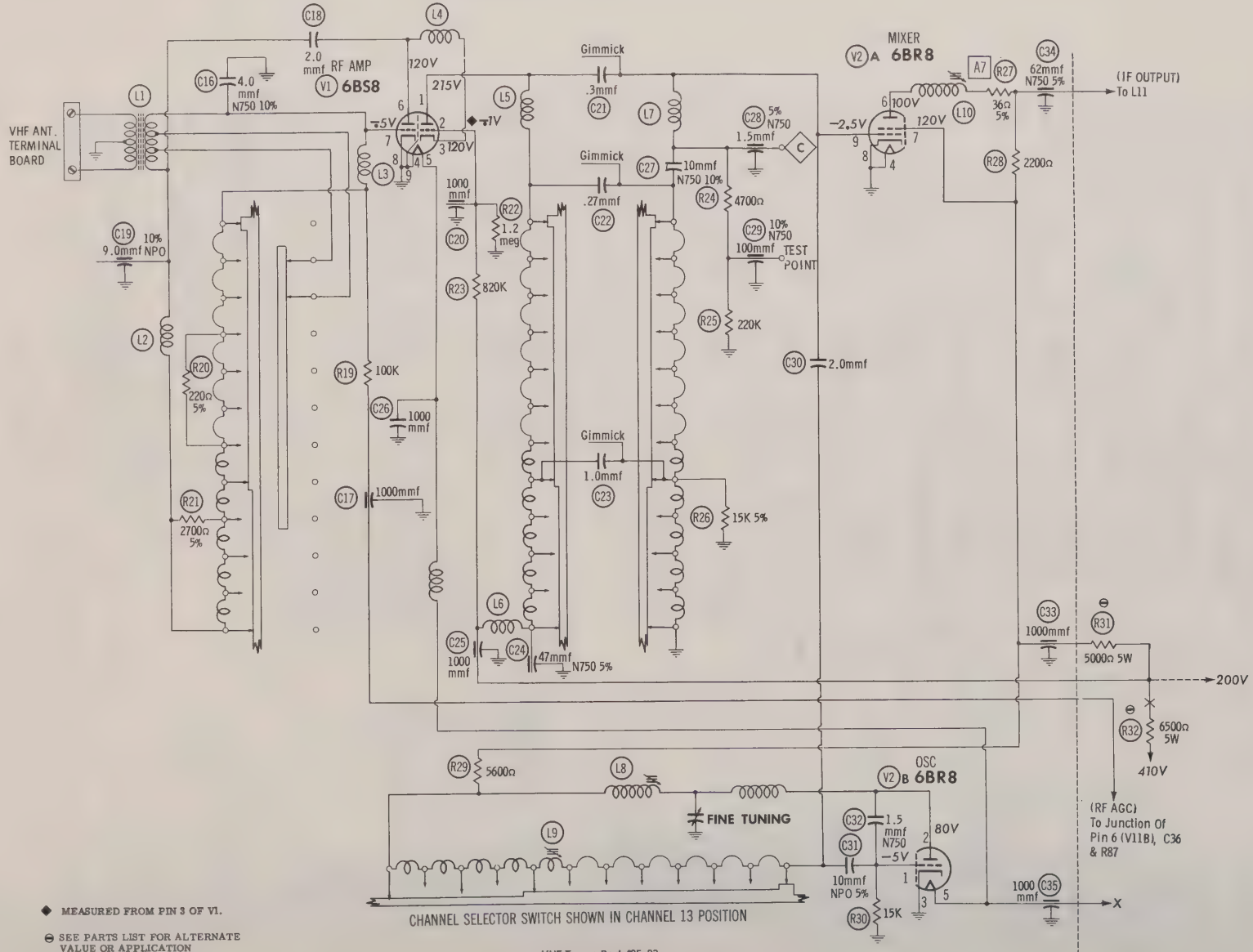
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

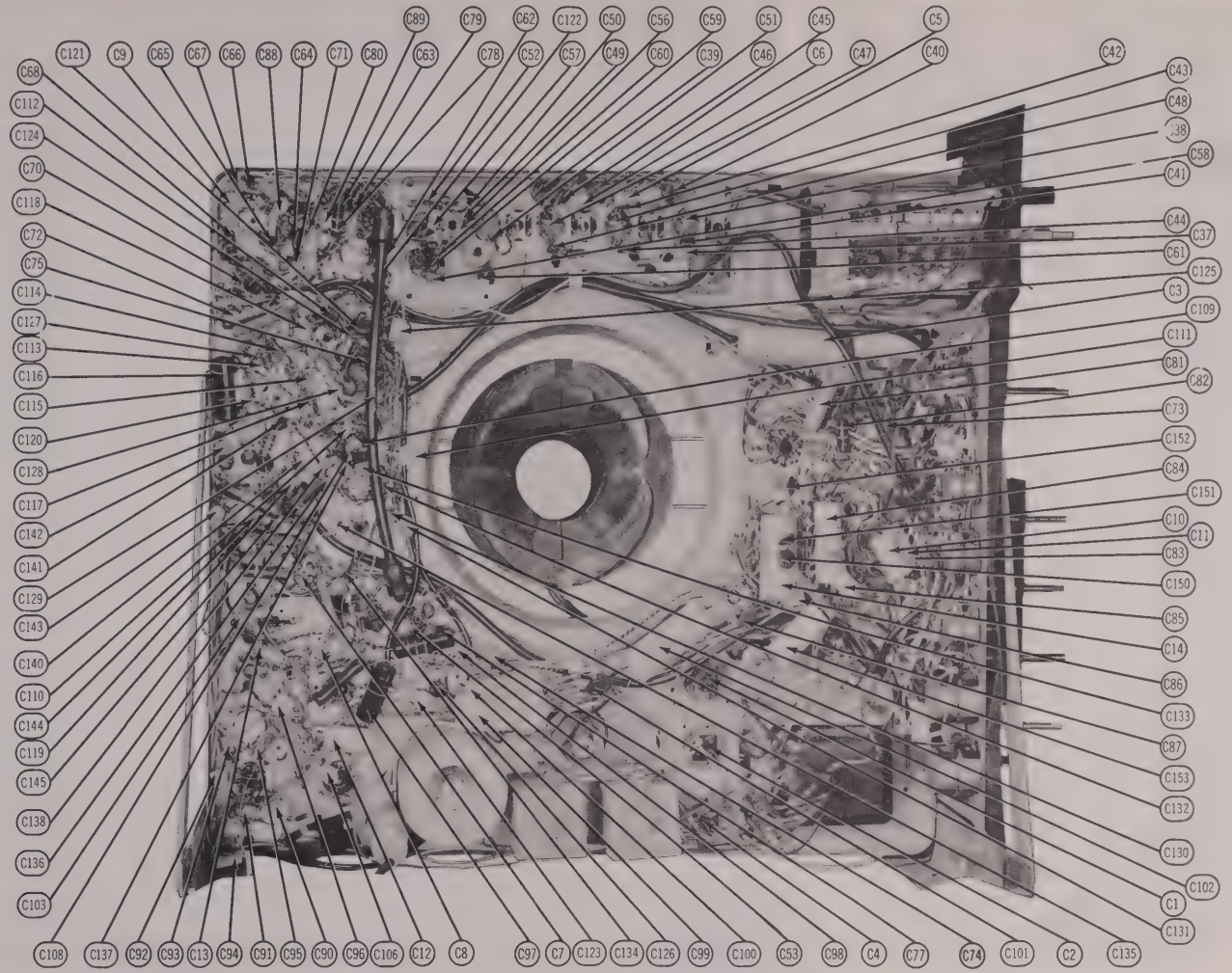
NAME	PART NO.	DESCRIPTION
Safety Glass	48-114	
Mask	31-335	Models 7140, 7142
Mask	31-358	Model 7138
Knob	52-664	Channel Selector - Models 7140, 7142
Knob	52-774-0	Channel Selector - Model 7138
Knob	52-587	Fine Tuning - Models 7140, 7142
Knob	52-773-0	Fine Tuning - Model 7138
Knob	52-658	On-off-volume, color contrast, horizontal hold
Knob	52-659	Brightness, contrast, vertical hold
Knob	52-660	Hue and focus
Cabinet	42-818	Model 7140
Cabinet	42-887	Model 7138
Cabinet	42-840	Model 7142
Leg	49-52	Model 7140
Leg	49-61	Model 7142

WIRING DATA

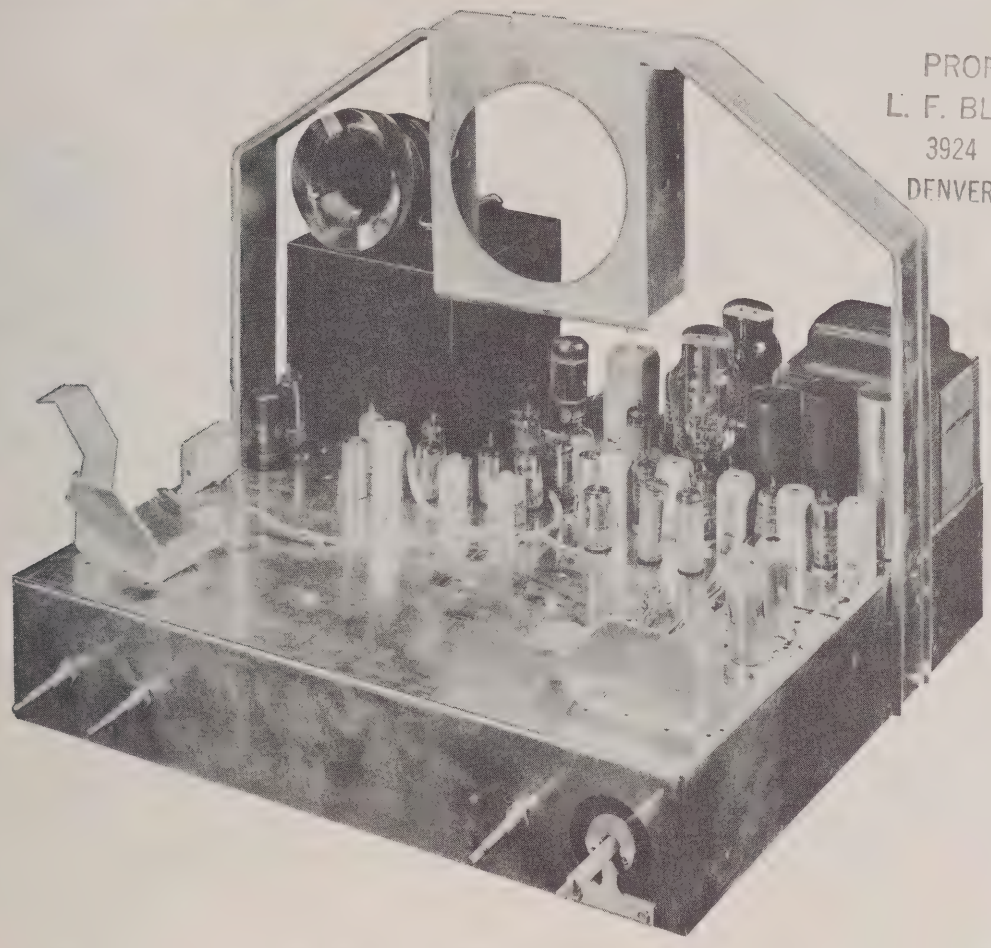
High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor)
		8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors
		8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor
		8485 (Round) - 5 Conductor
		8488 (Round) - 8 Conductor



TUNER SCHEMATIC



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TECH-MASTER MODELS
630-5, 630-5T

TECH-MASTER MODELS
630-5, 630-5T

TRADE NAME	Tech-Master Models 630-5, 630-5T
MANUFACTURER	Tech-Master Corp., 75 Front Street, Brooklyn, N.Y.
TYPE SET	Television Receiver
TUBES	Thirty-one
POWER SUPPLY	110-120 Volts AC, 60 Cycle RATING 300 Watts, 2.8 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound.

FOCUS

The focus may be varied by means of a focus control. (For location, see tube placement chart).

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Set the horizontal hold at the center of its range and adjust the horizontal frequency slug (B2) until the picture synchronizes horizontally. (For location, see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate sound IF detector buzz, adjust the discriminator secondary (A13) located on top of chassis.

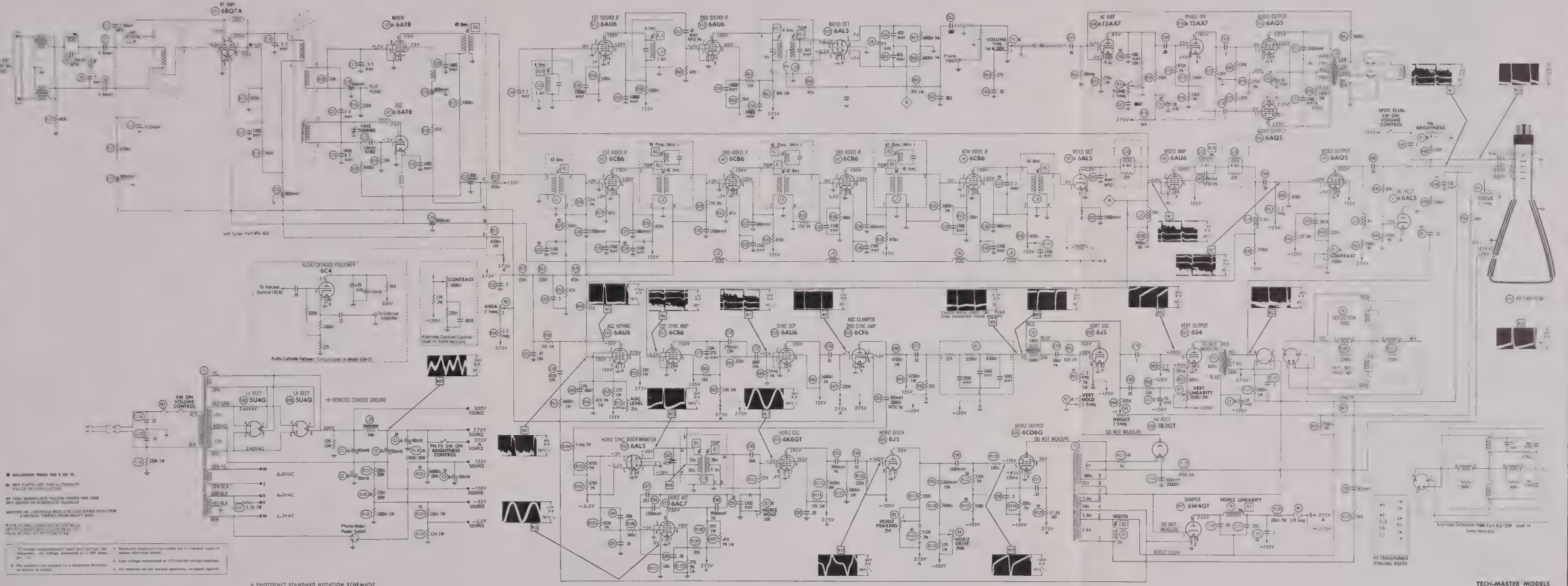
FUSES

One fuse is used for horizontal sweep circuit protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting a magnetic ring around the neck of the picture tube. Turn the knurled knob and at the same time rotate the ring around the tube until picture is properly centered.

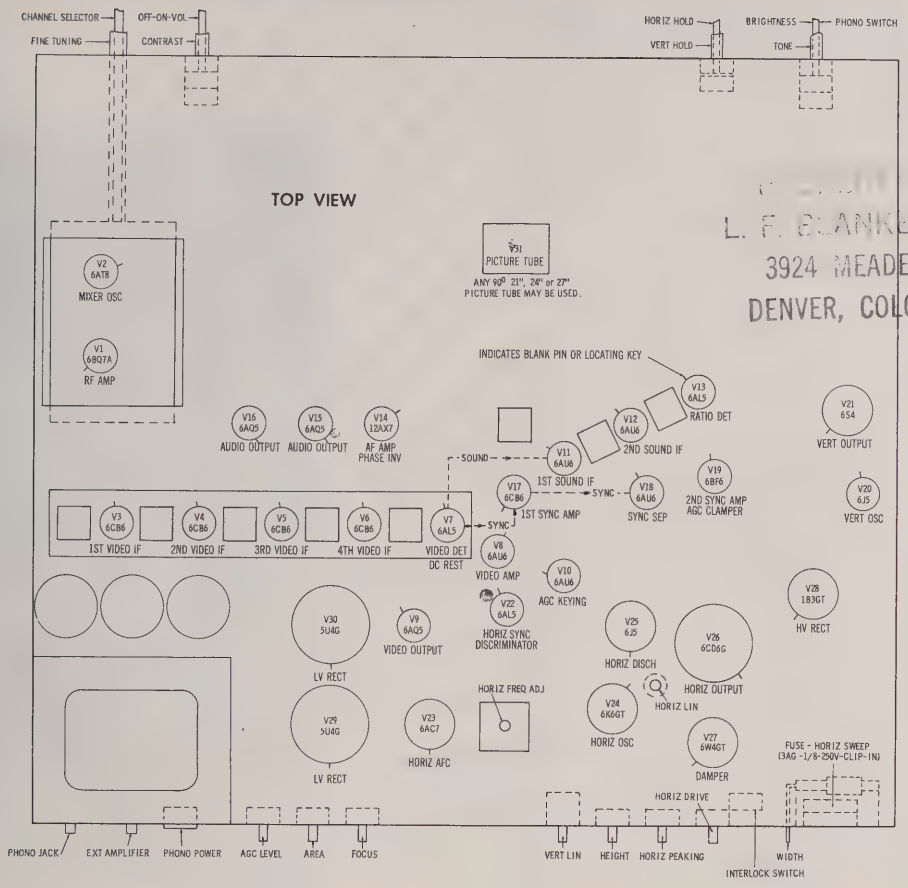
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America



A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

TECH-MASTER MODELS 630-5, 630-5T

TUBE PLACEMENT CHART



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DENVER, COLORADO

TUBE FAILURE CHECK CHART

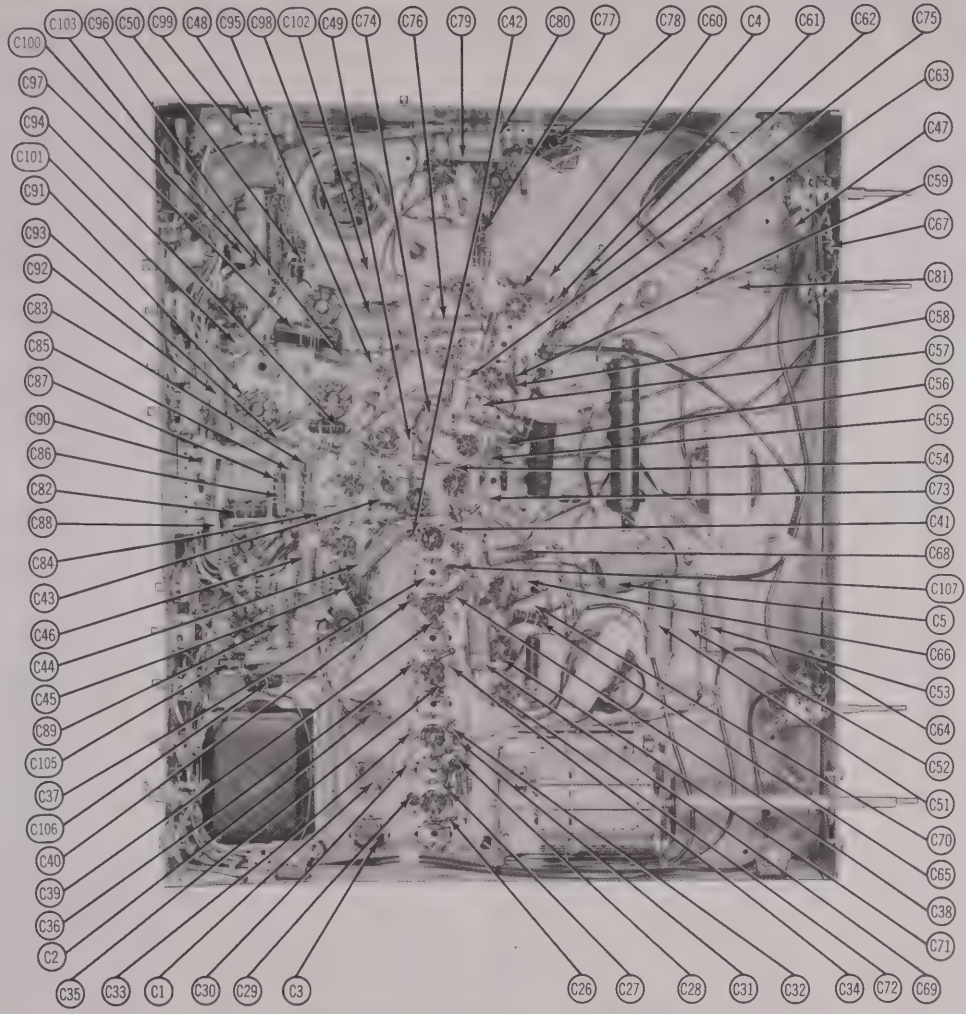
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - **V29, V30**

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, V6, V7**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V8, V9, V7, V31**
Has pic, no sound - **V11, V12, V13, V14, V15, V16**
Overloaded picture - **V10, V19**

SYNC FAILURE
No vert. sync - **V17, V18, V19**
No horiz. sync - **V17, V18, V19, V22, V23**
No vert. or horiz. sync - **V17, V18, V19**

SWEEP FAILURE
No raster, has sound - **Fuse (M1), V22, V23, V24, V25, V26, V27, V28, V31**
No vertical deflection - **V20, V21**
Poor vert. linearity or foldover - **V20, V21**
Poor horiz. linearity or foldover - **V24, V25, V26, V27**
Narrow picture - **V24, V25, V26, V27, V29, V30**
Vert. off freq. - **V20**
Horiz. off freq. - **V23, V24**



CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough generator output to provide a usable indication on VTVM.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over mixer-osc. tube (V2). Low side to chassis.	Not used	39.75MC (Unmod)	Any non-interfering channel	USE VTVM. DC probe thru 10K to point (A). Common to chassis.	A1	Adjust for MINIMUM deflection.
2.	"	"	"	41.25MC	"	"	A2	"
3.	"	"	"	47.25MC	"	"	A3	"
4.	"	"	"	43.8MC	"	"	A4, A5	Adjust for maximum deflection.
5.	"	"	"	42.3MC	"	"	A6	"
6.	"	"	"	43.8MC	"	"	A7	"
7.	"	"	"	45.6MC	"	"	A8	"
8.	"	"	"	43.8MC	"	"	A9	"
9.	"	"	43.5MC (10MC Swp)	39.75MC 41.25MC 41.9MC 45.75MC 47.25MC	"	Vert. Amp. thru 10K to point (A). Low side to chassis.		Check for response curve similar to Fig.1 with markers as shown. If necessary, SLIGHTLY retouch A1 thru A9 for desired response.

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.005mfd	High side to pin 1 (cathode) of 6AL5 (V7). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe to pin 5 (cathode) of 6AL5 (V15). Common to chassis.	A10, A11, A12	Detune A13 by turning in either direction several turns. Adjust A10, A11 and A12 for maximum deflection.
11.	"	"	"	"	DC probe to point (B). Common to chassis.	A13	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

4.5MC TRAP ALIGNMENT

Tune in a TV station and adjust the fine tuning for a grainy pattern in the picture.
Adjust A14 for MINIMUM interference in the picture.

OSCILLATOR ALIGNMENT

Set the fine tuning at the center of its range. The adjustments are accessible, one at a time, as the channel selector is rotated. Adjust for best picture and sound.

RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

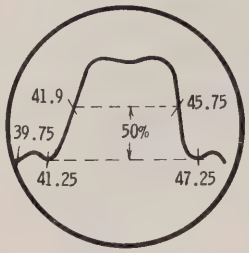
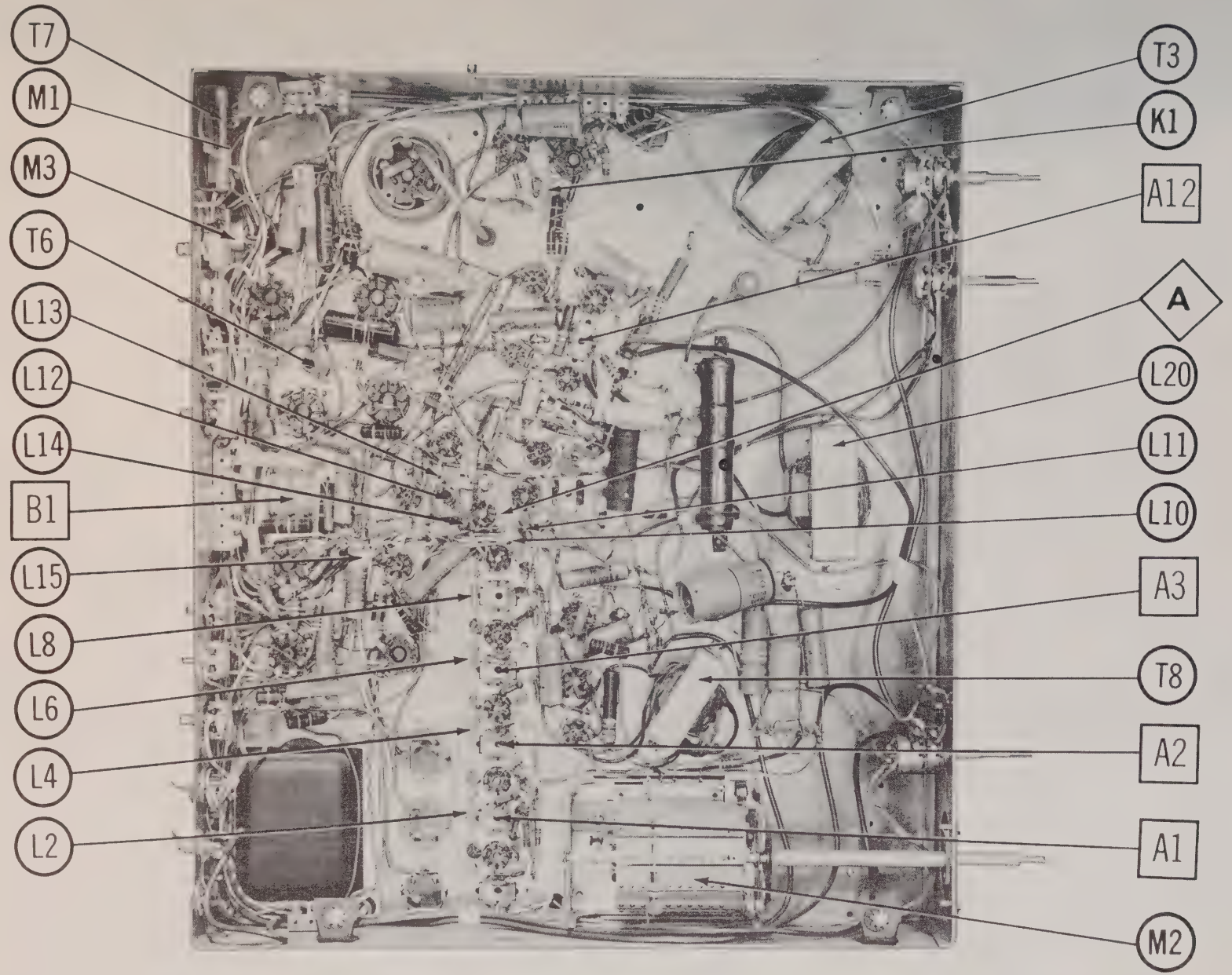
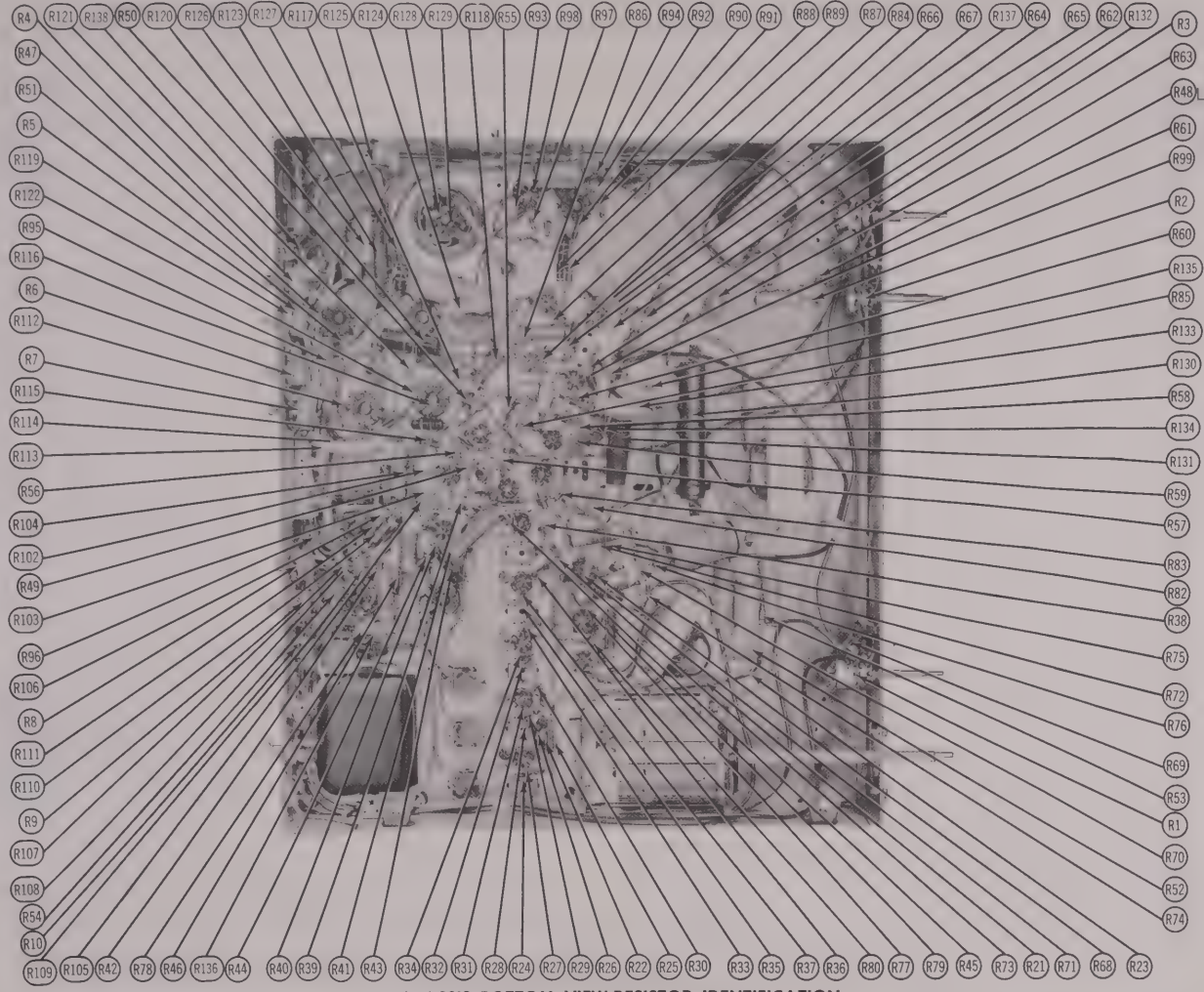


FIG.1



CHASSIS BOTTOM VIEW-TRANS., INDUCTOR AND ALIGNMENT IDENTIFICATION



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3924 MEADE St.
DENVER, COLORADO

CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BQ7A	INF	390K	0Ω	0Ω	.1Ω	† 4700Ω	320K	INF	0Ω
V2	6AT8	10K	† 6900Ω	0Ω	0Ω	.1Ω	† 2360Ω	† 48K	0Ω	220K
V3	6CB6	47K	47Ω	0Ω	.1Ω	† 1800Ω	† 1800Ω	0Ω		
V4	6CB6	47K	47Ω	0Ω	.1Ω	† 1800Ω	† 1800Ω	0Ω		
V5	6CB6	.1Ω	180Ω	0Ω	.1Ω	† 1800Ω	† 1800Ω	0Ω		
V6	6CB6	.1Ω	180Ω	0Ω	.1Ω	† 1800Ω	† 1800Ω	0Ω		
V7	6AL5	.1Ω	0Ω	0Ω	.1Ω	1meg	0Ω	3900Ω		
V8	6AU6	3900Ω	0Ω	0Ω	.1Ω	† 4060Ω	† 1360Ω	0Ω		
V9	6AQ5	460K	• 350Ω	0Ω	.1Ω	† 3300Ω	† 1360Ω	460K		
V10	6AU6	† 30K	• † 4200Ω	.1Ω	0Ω	260K	† 18K	• † 4200Ω		
V11	6AU6	1.6Ω	0Ω	0Ω	.1Ω	† 2360Ω	† 2360Ω	100Ω		
V12	6AU6	47K	0Ω	0Ω	.1Ω	† 28K	† 35K	0Ω		
V13	6AL5	INF	INF	.1Ω	0Ω	6800Ω	0Ω	6800Ω		
V14	12AX7	† 380K	10meg	270Ω	.1Ω	.1Ω	† 156K	570K	100K	0Ω
V15	6AQ5	150K	270Ω	0Ω	.1Ω	† 1320Ω	† 1050Ω	150K		
V16	6AQ5	150K	270Ω	0Ω	.1Ω	† 1300Ω	† 1050Ω	150K		
V17	6CB6	3900Ω	0Ω	0Ω	.1Ω	† 5000Ω	† 1200Ω	0Ω		
V18	6AU6	1meg	0Ω	0Ω	.1Ω	† 8100Ω	† 1360Ω	0Ω		
V19	6BF6	† 220K	0Ω	0Ω	.1Ω	390K	390K	† 9800Ω		
V20	6J5	0Ω	.1Ω	• ‡ 1.8meg	TP	• 2.3meg	TP	0Ω	0Ω	
V21	6S4	NC	• ▬ 1800Ω	NC	0Ω	.1Ω	▬ 2.2meg	NC	NC	‡ 8300Ω
V22	6AL5	950K	1.5meg	0Ω	.1Ω	12Ω	0Ω	1.5meg		
V23	6AC7	0Ω	0Ω	0Ω	1.4meg	10Ω	† 16K	.1Ω	† 20K	
V24	6K6GT	NC	.1Ω	† 5000Ω	† 10K	• 33K	TP	0Ω	9.5Ω	
V25	6J5	0Ω	0Ω	† 220K	TP	▬ 220K	NC	.1Ω	▬ 0Ω	
V26	6CD6G	TP	.1Ω	▬ 280Ω	NC	200K	NC	0Ω	17.5K	TOP CAP ‡ 21Ω
V27	6W4GT	TP	TP	¶	NC	† 335Ω	TP	‡ 14Ω	‡ 14Ω	
V28	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡ 401Ω
V29	5U4G	NC	¶	TP	▬ 17Ω	TP	▬ 17Ω	TP	¶	
V30	5U4G	TP	¶	NC	▬ 17Ω	NC	▬ 17Ω	NC	¶	
V31	Pix Tube	0Ω	1meg	PIN 6 • 60K	PIN 10 ‡ 1meg	PIN 11 • 170K	PIN 12 .1Ω			

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.

† MEASURED FROM 300V SOURCE

‡ MEASURED FROM PIN 3 OF V27.

▬ MEASURED FROM 120V SOURCE

NC NO CONNECTION.

TP TIE POINT.

CHASSIS TOP VIEW

TECH-MASTER MODELS
630-5, 630-5T

FOLDER 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	6BQ7A	
V2	Mixer-Osc.	6AT6	
V3	1st Video IF Amp.	6CB6	
V4	2nd. Video IF Amp.	6CB6	
V5	3rd. Video IF Amp.	6CB6	
V6	4th. Video IF Amp.	6CB6	
V7	Video Det. -DC Restorer	6AL5	
V8	Video Amp.	6AL6	
V9	Video Output	6AQ6	
V10	AGC Keying	6AU6	
V11	1st. Sound IF Amp.	6AU6	
V12	2nd. Sound IF Amp.	6AU6	
V13	Ratio Det.	6AL5	
V14	AF Amp -Phase Inv.	12AX7	
V15	Audio Output	6AQ6	
V16	Audio Output	6AQ6	
V17	1st. Sync Amp.	6CB6	
V18	Sync Separator	6AU6	
V19	2nd Sync Amp.- AGC Clamper	6BF6	
V20	Vert. Osc.	6J5	
V21	Vert. Output	6B4	
V22	Horiz.Sync Discriminator	6AL5	
V23	Horiz AFC	6AC7	
V24	Horiz. Osc.	6SN7GT	
V25	Horiz. Discharge	6J5	
V26	Horiz. Output	6CD6G	
V27	Damper	6W4GT	
V28	HV Rectifier	1B3GT	
V29	LV Rectifier	5U4G	
V30	LV Rectifier	5U4G	

PICTURE TUBE

ITEM No	REPLACEMENT DATA: Tech-Master PART No	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	NOTES
V31	1			1. Any 90° 21 24 or 27 picture tube may be used

ELECTROLYTIC CAPACITORS

ITEM No.	RATING: CAP	+Volt	Tech-Master PART No	REPLACEMENT DATA: AEROVOX PART No	CORNELL DUBILIER PART No	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No
C1A	40	450		AFH3-142-50	DHTT	FP244	TMD-51	D-365	TVL-3966 *
B	40	450			BH1005	*TC50	TO-80-450	*MT-4580	
C	50	50							
C2A	40	450		AFH3-54	C2410	FP394	TMT-46	D-380	TVL-3966
B	40	500						MT-5010	
C3A	40	400	1	AFH3-46	C0370	FP378	TMT-43	T-180	TVL-3793
B	40	350							
C	20	400							
C4	5	50		PR50V5	BBR5-50	TC90	TD-8-50	MT-0604	TVA-1303
C5	20	450	①	PR450V20	BR2045	TC79	TD-20-450	MT-4520	TVA-1709

* Non-catalog item

1 In some versions C3 may be a 4th. section of C2.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP	VOLT	Tech-Master PART No	REPLACEMENT DATA: AEROVOX PART No	CENTRALAB PART No	CORNELL DUBILIER PART No	RMC PART No	MALLORY PART No	SPRAGUE PART No	NOTES
C6	120			N750-S1 120	TCN-20	CT45T2U	TC7-120			N750
C7	5.6			NPO-D1 5.6	TCZ-5R6	C10Y5BC	TCO-5.6	ZT-5568	5TCCB-V56	
C8	5.6			NPO-D1 5.6	TCZ-5R6	C10Y5BC	TCO-5.6	ZT-5568	5TCCB-V56	
C9	5.6			NPO-DI 5.6	TCZ-5R6	C10Y5C	TCO-5	ZT-556	5TCCB-V47	
C10	3-15									
C11	3.3			NPO-S1 3.3	TCZ-3R3	C10Y2ZC	TCO-3.3		5TCCB-V32	NPO
C12	800									
C13	1000			BPD-001	DD-102	BYA5DI	ED-1000	DC52I	5HK-DI	
C14	5-3				829-3		3115-D	CT565A		
C15	800									
C16	800									
C17	5-3					533-A				
C18	50									
C19	800									
C20	1000			BPD-001	DD-102	BYA5DI	ED-1000	DC52I	5HK-DI	
C21	1.0			NPO-S1 1.0	TCZ-1		TCO-1		5TCCB-V1	
C22	10									N.400
C23	800									
C24	8.2									N900
C25	7000			BPD-001	DD-102	BYA5DI	ED-1000	DC52I	5HK-DI	
C26	1500			BPD-001	DD-102	BYA10DI5	ED-1500	DC52I5	5HK-DI5	
C27	680			BPD-00068	DD-681	BYA10T68	FD-680	CC-5368	5GA-T68	
C28	1500			BPD-001	DD-102	BYA10DI5	FD-500	DC52I5	5HK-DI5	1
C29	1500			BPD-001	DD-102	BYA10DI5	ED-1500	DC52I5	5HK-DI5	
C30	1500			BPD-001	DD-102	BYA10DI5	ED-1500	DC52I5	5HK-DI5	
C31	1500			BPD-001	DD-102	BYA10DI5	ED-1500	DC52I5	5HK-DI5	①
C32	680			BPD-00068	DD-681	BYA10T68	ED-680	CC-5368	5GA-T68	
C33	1500			BPD-001	DD-102	BYA10DI5	ED-1500	DC52I5	5HK-DI5	
C34	680			BPD-00068	DD-681	BYA10T68	ED-680	CC-5368	5GA-T68	
C35	1500			BPD-001	DD-102	BYA10DI5	ED-1500	DC52I5	5HK-DI5	
C36	1500			BPD-001	DD-102	BYA10DI5	ED-1500	DC52I5	5HK-DI5	
C37	2.2			NPO-S1 2.2	TCZ-2R2	C10Y2ZC	TCO-2.2		5TCCB-V22	①
C38	680			BPD-00068	DD-681	BYA10T68	ED-680	CC-5368	5GA-T68	
C39	1500			BPD-001	DD-102	BYA10DI5	ED-1500	DC52I5	5HK-DI5	
C40	1500			BPD-001	DD-102	BYA10DI5	ED-1500	DC52I5	5HK-DI5	
C41	5.6			NPO-DI 5	TCZ-5R7	C10Y5C	TCO-5	ZT-556	5TCCB-V5	NPO
C42	1500			BPD-001	DD-102	BYA10CI5	ED-1500	DC52I5	5HK-DI5	
C43	43				TCN-43		TC7-43	GEM-415	4TM-S5	N750 5%
C44	25	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C45	.0018	600			D6-182	L76DI8	GP-1800			
C46	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C47	1	400		P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C48	100			1468-0001	D6-101	5WST1	ED-100	UC-531	1FM-31	②
C49	.0047	600							GEM-5247	10%
C50	.0018	600								10%
C51	.47	200								10%
C52	5	100		P288N-5		CUB2P5		GEM-306	2TM-P5	
C53	2	200		P288N-22		CUB2P22		GEM-3022	2TM-P22	
C54	2.2			NPO-S1 2.2	TCZ-2R2	C10Y2ZC	TCO-2.2		5TCCB-V22	
C55	10000			BPD-01	DD-103	BYA5EI	ED-01	DC5II	5HK-SI	
C56	10000			BPD-01	DD-103	BYA5EI	ED-01	DC5II	5HK-SI	
C57	47				TCZ-47		TCO-47			NPO 5%
C58	10000			BPD-01	DD-103	BYA5EI	ED-01	DC5II	5HK-SI	
C59	10000			BPD-01	DD-103	BYA5EI	ED-01	DC5II	5HK-SI	
C60	470			1468-00047	D6-471	5WST47	ED-470	UC-5347	1FM-347	
C61	470			1468-00047	D6-471	5WST47	ED-470	UC-5347	1FM-347	
C62	.003	600		P288N-003	D6-302	CUB3D2	GP-3200	GEM-532	6TM-D2	
C63	.003	600		P288N-003	D6-302	CUB3D2	GP-3200	GEM-532	6TM-D2	
C64	.01	600		P288N-01	D6-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C65	.01	400		P488N-01	D6-103	CUB4S1	GP-10000	GEM-41	4TM-S1	
C66	100			1468-001	D6-101	5WS1	ED-100	MC355	1FM-31	③ 10%
C67	.0047	600		P288N-0047	D6-472	CUB5D47	GP-4700	GEM-5247	6TM-D47	

CAPACITORS (cont)

ITEM No.	RATING: CAP	VOLT	Tech-Master PART No.	REPLACEMENT DATA: AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C88	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C89	.1	400		P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C90	.1	400		P488N-1	DF-104	CUB4P1		GAM-401	4TM-P1	
C91	1500			BPD-0015	DD-152	BYA10DI5	ED-1500	DC52I5	5HK-DI5	
C92	1500			BPD-0015	DD-152	BYA10DI5	ED-1500	DC52I5	5HK-DI5	
C93	270			1469-00027	D6-271	5RST27	ED-270		M3-327	
C94	270			1469-00027	D6-271	5RST27	ED-270		M3-327	10%
C95	.0047	600						GEM-5247		10%
C96	.05	600		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	10%
C97	.01	400		P488N-01	D6-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C98	3900			1464-0039		1R5D39			M5-S39	5%
C99	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C100	.004	600		P288N-004	D6-402	CUB4D4	GP-4000	GEM-424	4TM-D4	
C101	1500			BPD-0015	DD-152	BYA10DI5	ED-1500	DC52I5	5HK-DI5	①
C102	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5	
C103	390								M5-S39	5%
C104	.01	400		P488N-01	D6-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C105	680			1464-00068	D6-681	1R5T68	ED-680		M5-S68	
C106	1000			1467-001	D6-103	1W5D1	ED-1000	MC355	1FM-31	
C107	.22	400		P488N-22		CUB4P22		GEM-4022	4TM-P22	
C108	.5	100		P288N-05		CUB2P5		GEM-305	2TM-P5	
C109	82			91 82	D6-820	L76Q82	GP-82		5GA-Q82	
C110	.05	600		P688N-05	DF-503	CUB6S5		GEM-615	6TM-S5	
C111	.033	600		P688N-033		CUB6S33		GEM-6133	6TM-S33	
C112	.2	600		P688N-22		CUB6P22		GEM-6022	6TM-P22	④
C113	.1	600		P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C114	600	30000		UV-503	TV-30	MMU300T5	413-1	HV30035A	20DE-T5	
C115	.01	400		P488N-01	D6-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C116	.01	400		P488N-01	D6-103	CUB4S1	GP-10000	GEM-41	4TM-S1	
C117	1500			BPD-0015	DD-153	BYA10DI5	ED-1500	DC52I5	5HK-DI5	②

① Not used in some versions.
② Some versions use 120mmf in this application.
③ Some versions use .033mfd in this application.
④ Some versions use .25mfd in this application.

CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: Tech-Master PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No	MALLORY PART No	INSTALLATION NOTES
R1A	5000Ω	½		F1-35				Contrast
B	1meg	½		B2-51		*	# UE27B08	Volume - Tap ② 200K
C	Switch			KB-2				
R2A	1.5meg	½		F1-84		*	* UE27B3	Vert. Hold
B	50K	½		B2-29				Horiz. Hold
R3A	1.5meg	½		F1-84		*	† UE27B6	Tone
B	50K	½		B2-29				Brightness
C	Switch			KB-1				
R4A	250K	½		AB-50	A47-250K-S	QU-130	U46	Horiz Drive
B	Shaft			AK-1	FKH-1/4	SQ	Not Req.	
R5A	25K	½		AB-26	A47-25K-S	QU-130	U29	Horiz. Peaking
B	Shaft			AK-1	FKH-1/4	SQ	Not Req.	
R6A	2.5meg	½		AB-53	A47-2.5meg-S	QU-239	U355	Height
B	Shaft			AK-1	FKH-1/4	SQ	Not Req.	
R7A	2500Ω	3(WW)		WN-253	A43-2500Ω	WPG 2500	R2500L	Vert. Lin.
B	Shaft			Not Req.	FKH-1/4	Not Req.	Not Req.	
R8A	2.5meg	½		AB-53	A47-2.5meg-S	QU-239	U355	Focus
B	Shaft			AK-1	FKH-1/4	SQ	Not Req.	
R9A	2 Smeg	½		AB-53	A47-2 Smeg-S	QU-239	U255	Area
B	Shaft			AK-1	FKH-1/4	SQ	Not Req.	
R10A	25K	½		AB-26	A47-25K-S	QU-120	U29	AGC Level
B	Shaft			AK-1	FKH-1/4	SQ	Not Req.	

* Concentrikit Equivalent K-2 Kit, Base Elements & Shafts B17-114, P1-118 (Panel)

B13-137, RI-305 (Rear)

TS-2 (Switch)

STA-LOC, Equivalent FD53R, OF1562, RU15T25, RS12S, U542.

▲ Concentrikit Equivalent K-3 Kit, Base Elements & Shafts B11-138, P1-119 (Panel)

B11-123, RI-230 (Rear)

* STA-LOC, Equivalent FD55L, OF1562, RU54L, RS12S

▲ Concentrikit Equivalent K-3 Kit, Base Elements & Shafts B11-138, P1-118 (Panel)

B11-123, RI-305 (Rear)

T6-1 (Switch)

† STA-LOC, Equivalent FA15SL, OF1562, RU54L, RS12S, U8-4L.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING: OHMS	WATT	Tech-Master PART No	NOTES
R11	680K			
R12	470Ω			
R13	820K			
R14	560K			
R15	10K			
R16	220K			
R17	1000Ω			
R18	47K			
R19	10K			
R20	6800Ω			
R21	4700Ω	1		
R22	470Ω			
R23	220K			
R24	15K 5%			Note 1
R25	680Ω			
R26	470Ω			

ITEM No.	RATING: OHMS	WATT	Tech-Master PART No.	NOTES
R30	470Ω			
R31	47Ω			
R32	15K 5%			
R33	470Ω			
R34	180Ω			
R35	6800Ω 5%			
R36	470Ω			
R37	180Ω			
R38	39000 5%			
R39	2700Ω			
R40	620K			
R41	1.5meg			
R42	3300Ω	1		
R43	220Ω			
R44	12K	2		
R45	1meg 5%			
R46	47K			
R47	1meg 5%			
R48	150K			

RESISTORS (cont)

ITEM No.	RATING: OHMS	WATT	Tech-Master PART No.	NOTES
R49	27K			
R50	18K	1		
R51	6800Ω	1		
R52	220K			
R53	47K			
R54	2.2meg			
R55	12K	1		
R56	47K 5%	1		
R57	12K	1		
R58	1000Ω			
R59	100Ω			
R60	47K			
R61	39K	1		
R62	33K			
R63	56K			
R64	47Ω	1		
R65	39K	1		
R66	6800Ω 5%			
R67	6800Ω 5%			
R68	10meg			
R69	27K			
R70	330K			
R71	2700Ω	1		
R72	470K 5%			
R73	100K 5%			
R74	56K			
R75	3300Ω			
R76	100K 5%			
R77	150K			
R78	1000Ω	5		
R79	270Ω	2		
R80	150K			
R81	5600Ω			
R82	10K	5		
R83	10K			
R84	1meg 5%			
R85	220K			
R86	6800Ω 5%			
R87	220K			
R88	4700Ω	1		
R89	470Ω	1		
R90	22K	1		
R91	1.5meg 5%	1		Note 2
R92	62K	1		
R93	2.5meg			
R94	620K			

ITEM No.	RATING: OHMS	WATT	Tech-Master PART No.	NOTES
R95	7500Ω	3		
R96	100K			
R97	680Ω			
R98	10K			
R99	1000Ω			
R100	2200Ω			
R101	2300Ω			
R102	470K 5%			
R103	470K 5%			
R104	470K 5%			
R105	470K 5%			
R106	680Ω			
R107	47K 5%	1		
R108	39K	1		
R109	39K			
R110	27K 5%	1		
R111	10Ω			
R112	27K			
R113	5000Ω	4		
R114	10K	1		
R115	6800Ω	1		
R116	220K			
R117	220K			
R118	5600Ω			
R119	12K	1		
R120	100Ω			
R121	330K			Note 3
R122	100K 5%			Note 4
R123	17K 5%	4		Note 4
R124	220Ω	7		
R125	39Ω			
R126	220Ω	7		
R127	5300Ω	1		
R128	3Ω	6		Note 5
R129	470K	1		
R130A	1250Ω		30	
B	2300Ω		20	
R131	6800Ω 5%		20	Note 8
R132	2200Ω		20	
R133	100Ω	6		Note 7
R134	12Ω	1		
R135	1000Ω	1		
R136	220Ω	1		
R137	2.2Ω	1		
R138	510K 5%			Note 8

Note 1. Some versions may use a 470Ω in this application.
Note 2. Some versions may use a 1.5meg in this application.
Note 3 Some versions may use a single 680K to replace R131 and R122
Note 4. Some versions may use a 25K, 4W in this application
Note 5. Some versions may use a 5.3Ω in this application.
Note 6 Some versions may use a 6500Ω, 20W in this application
Note 7. Some versions may use a 82Ω, 5W in this application
Note 8. Not used in some versions.

TRANSFORMER (POWER)

ITEM No.	RATING: PRI.	SEC. 1	SEC. 2	SEC. 3	Tech-Master PART No.	REPLACEMENT DATA: Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V	740VCT	6V	6.3V	TP-147A					
	② 2.8A	② 340A	③ 8A	①1.2A SEC. 4 12.6VCT ② 8A						

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	Tech-Master PART No	Halldorson PART No	Merit PART No	Ram PART No	Stancor PART No	Thordarson PART No	Triad PART No	NOTES
T2	Vert. Osc.	T8T2A	B8701 ①	A-4003 ①	V402 ①	A-8111	26A04 ①	A-9TY ①	
T3	Vert. Output	TVO-4	Z1902 ②		V308		26S75 ②	A-10GX	
T4A	Yoke-Horiz (20 5MH	LD-220P							
B	(90°)-Vert.(48MH)								
	Alt. Yoke	LD-230F							
T5	Horiz Output	T25T2						D-95*	
T6	Horiz. Linearity			MWC-8 ④	20LR12 ④	WC-8	WC-22	WLC-5	
	Coil (1.2-10MH)								
T7	Width Coil			MWC-9 ① ③	20LR12 ④⑤	WC-8 ⑤	WC-32 ⑤	WLC-5 ①	

① Drill new mounting hole(s).
② Use 13 to 1 turns ratio.
③ Use 15 to 1 turns ratio.
④ Do not use tap.
⑤ Use original core and mounting bracket.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
9						5
8						3
7						3
6						2
5						1
Connect Width Coil Across	3 & 1					2 & 1

TECH-MASTER MODELS 630-S, 630-ST

FOLDER 2

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Tech-Master PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T8	7500Ω CT	16Ω tap ⓐ 8Ω, 4Ω	140-153	Z1404 ①			26S59		① Drill new mounting hole..

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Tech-Master PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	1st. Video I F		17-5004	TV-126	6234		
L2	Fil. Choke		19-1000	BC-561	4602		1.1 Microhenries
L3	2nd. Video IF			TV-127			Includes 39.75MC Trap
L4	Fil. Choke		19-1000	BC-561	4602		1.1 Microhenries
L5	3rd. Video IF		17-5002	TV-127	6232		Includes 41.25MC Trap
L6	Fil. Choke		19-1000	BC-561	4602		1.1 Microhenries
L7	4th. Video IF		17-5003	TV-128	6233		Includes 47.25MC Trap
L8	Fil. Choke		19-1000	BC-561	4602		1.1 Microhenries
L9	5th. Video IF		17-5004	TV-126	6234		
L10	Series Peaking Coil		19-4122	TV-182	6178	VP-4 ▲	120 Microhenries, wound on 22K resistor
L11	Shunt Peaking Coil		19-3250	TV-185	6181	VP-6	250 Microhenries
L12	4.5MC Trap		20-1004	TV-151	1469 *	SF-3	
L13	Series Peaking Coil		19-4122	TV-182	6178	VP-4 ▲	120 Microhenries, wound on 22K resistor
L14	Shunt Peaking Coil		19-3093	TV-181	6177	VP-3	93 Microhenries
L15	Shunt Peaking Coil		19-3093	TV-181	6177	VP-3	93 Microhenries
L16	1st. Sound IF						
L17	2nd. Sound IF						
L18	Ratio Detector		17-3497	TV-115	6205	SD-4	

▲ Parallel with a 22K resistor. * Disregard tap.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	Tech-Master PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	
L19	64Ω CT	37.5Ω *			TV-160	6194	H-101	HS-1	* Tapped ⓐ 9.5Ω

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	Tech-Master PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L20	.280A	54Ω	2.2 Hy.		C5037 ①	C-2991 ①	C-2334	26C93 ①	C-17X ①

① Drill new mounting hole.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Tech-Master PART No.	REPLACEMENT DATA	
K1	Vert. Integrator	2000mmf, 5000mmf, 5000mmf, 22K, 8200Ω, 8200Ω		Aerovox Centralab Cornell-Dubilier Erie Sprague	PA-110 PC-104 115TM1 1405-01 V-1

FUSES

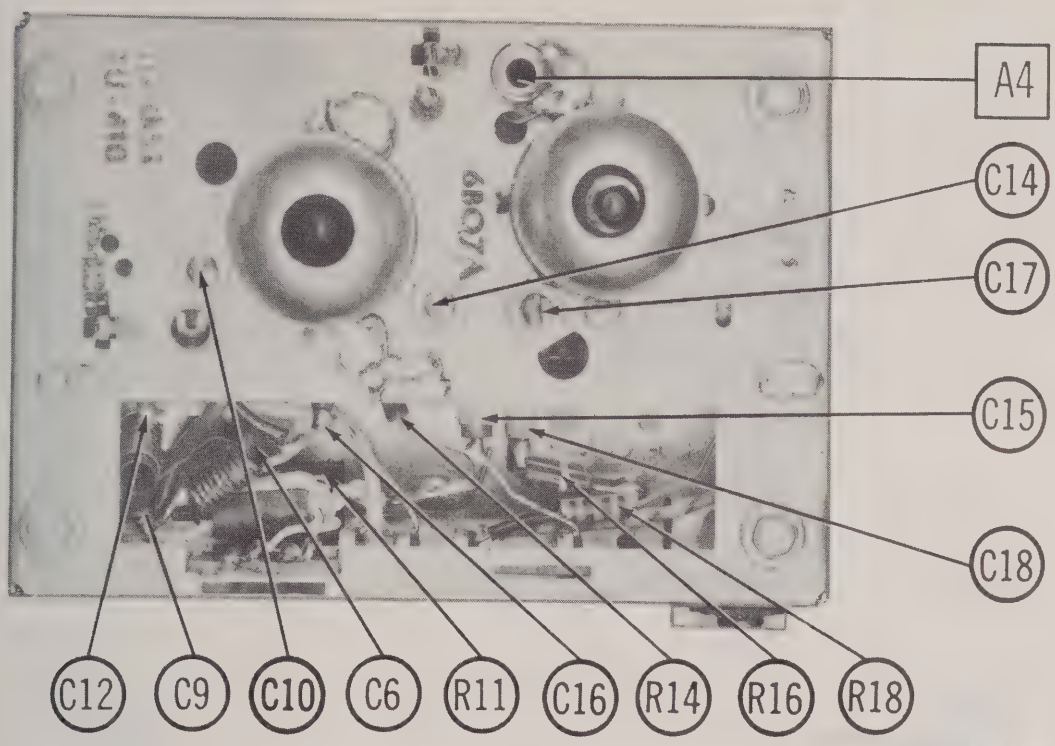
ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			Tech-Master PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	3AG	1/8A 250V			312.125 (3AG-1/8A-250V)	357001	AGC 1/8	4405

MISCELLANEOUS

ITEM No.	PART NAME	Tech-Master PART No.	NOTES
M2	Tuner	TV-410	VHF
M3	Switch		Safety Interlock

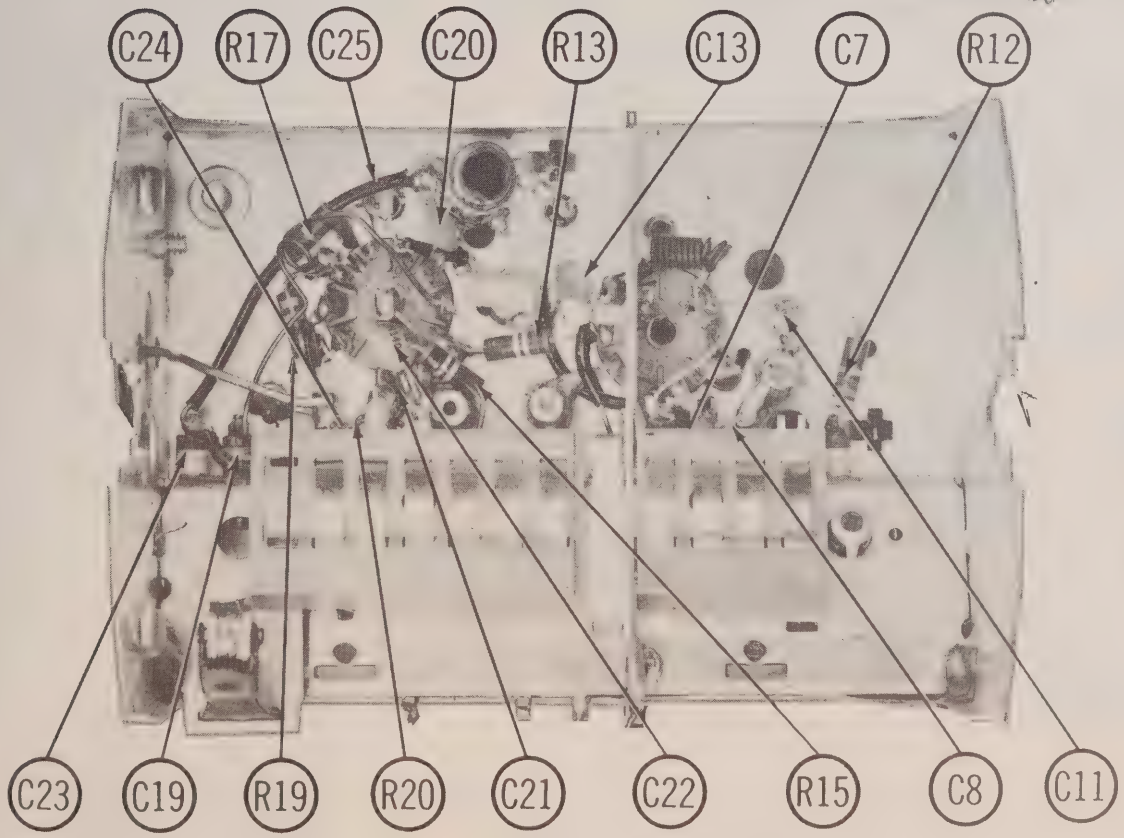
WIRING DATA

High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor



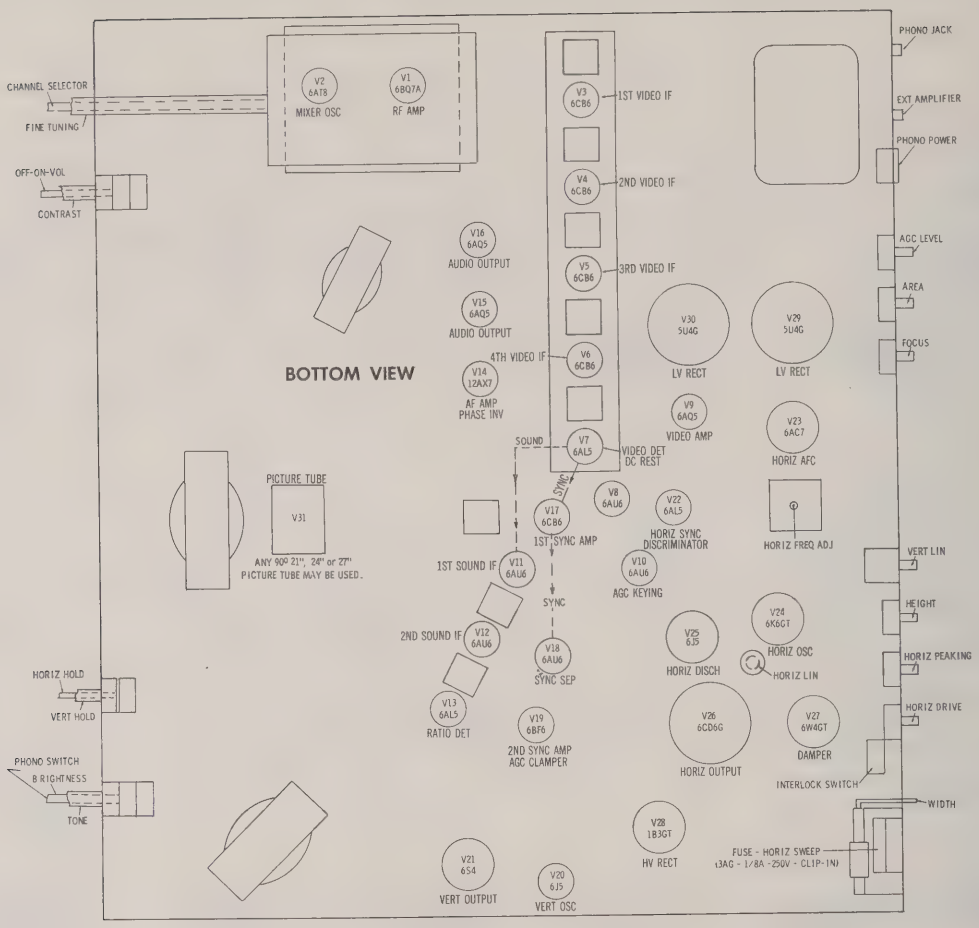
RF TUNER-TOP VIEW

3024 MEADE ST.
DENVER, COLORADO



RF TUNER-BOTTOM VIEW

FOLDER 2



TUBE PLACEMENT CHART

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

HORIZONTAL OSCILLATOR ALIGNMENT CHECK

While receiving a television signal turn the horizontal hold control fully counter-clockwise. Remove the picture momentarily by turning the contrast control fully counter clockwise and then return it to its normal operating position. The picture should pull back into synchronization.
Now turn the horizontal hold control fully clockwise. Remove the picture momentarily by turning the contrast control fully counter clockwise and then return to its normal operating position. The picture should pull back into synchronization.
If receiver synchronizes properly under these checks it is not necessary to align the horizontal oscillator. However, if the picture is not normal or stable, the horizontal oscillator must be aligned.

SLIGHT RETOUCH ALIGNMENT

If the receiver failed in the above check at either extreme of the hold control, it may be possible to align the horizontal oscillator by making SLIGHT adjustments.
Tune in a TV station and adjust the fine tuning for best sound quality. Adjust vertical hold control to vertically synchronize the picture. Adjust the con-contrast control to SLIGHTLY less than normal. Turn the horizontal hold control to the extreme position in which the oscillator falls out of synchroni-zation. Momentarily remove the signal. Adjust B2 until the oscillator pulls into synchronization. Check hold and pull-in as outlined above.

COMPLETE ALIGNMENT

Tune in a TV station for the best sound quality. Adjust vertical hold control to vertically synchronize the picture. Adjust the contrast control to SLIGHTLY less than normal.
Adjust B1 until the blanking bar, which may appear in the picture, moves to the right and off the raster. If ripples occur in the raster turn B1 in a clockwise direction until the unstable condition is removed. The length of this adjustment screw in its correct position is usually about 1/2 inch beyond the bushing.
Turn horizontal hold control fully counter clockwise and adjust B2 clockwise until picture fails to synchronize. Now slowly turn B2 counter clockwise to the point where the picture synchronizes. Readjust B1 so that the left side of the picture is close to the left side of the raster, but does not fold over.
Turn the horizontal hold control fully clockwise. The right side of the picture should be close to the right side of the raster, but should not fold over. If it does, readjust B1.
Momentarily remove the signal. When signal is restored, the picture should fall into synchronization. If it does not, turn B1 counter clockwise until picture falls into synchronization.
Turn horizontal hold control fully counter clockwise. Picture should fall back into synchronization after momentary removal of the signal.
If the picture fails to synchronize after momentary removal of the signal at both extremes of the horizontal hold control, there may be insufficient pull-in range. However, if picture will pull-in through 3/4 of the hold control range, operation should be satisfactory as excessive pull-in is objectionable. Excessive pull-in makes the control circuits more sensitive which may result in their being triggered by noise pulses. Also, the vertical synchronizing and equalizing pulses may cause a bend in the upper part of the picture.

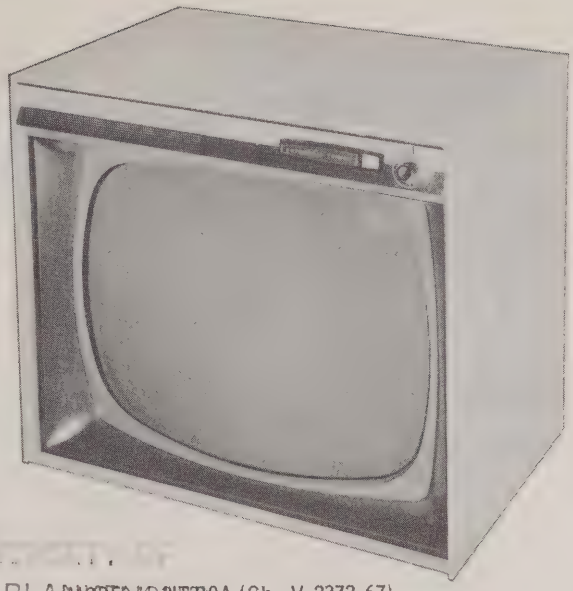
HORIZONTAL LINEARITY ADJUSTMENTS

Turn the horizontal drive control clockwise as far as possible without crowding the right half of the picture. Adjust the width slug (B3) until the picture is SLIGHTLY wider than necessary to fill the mask horizontally. Adjust the horizontal linearity slug (B4) until the picture is symmetrical from left to right.
Since both width and horizontal linearity are effected by the drive control, it may be necessary to readjust it to obtain optimum linearity with proper width.

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

WESTINGHOUSE MODELS H-21K223 thru H-21K229, H-21K232, 233, H-21KU223, A thru H-21KU229, A, H-21KU232, A, 233, A, H-21T218, A thru H-21T222, A, H-21TU218, A, B, C thru H-21TU222, A, B, C (Ch. V-2372-27, -67, V-2382-202, -204, -602, -604)

DISASSEMBLY INSTRUCTIONS



CHASSIS REMOVAL

1. Remove 2 push-on type knobs from the front.
2. Remove 5 metal screws from the bottom edge of the escutcheon.
3. Remove the escutcheon.
4. Remove 3 push-on type knobs accessible after escutcheon removal.
5. Remove 9 metal screws from the rear cover. Remove the rear cover.
6. Remove the metal screw holding the antenna terminal board.
7. Remove 6 chassis bolts from the bottom.
8. Remove the chassis.

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

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DENVER, COLORADO

MODEL H-21T219A (Ch. V-2372-67)

TRADE NAME	Westinghouse	MODELS	CHASSIS
		H-21K223, 224, 225, 226, 227, 228, 229, 232, 233, H-21T218, 219, 220, 221, 222, 223, 224, 225	V-2372-27
		H-21T218A, 219A, 220A, 221A, 222A	V-2372-67
		H-21KU223, 224, 225, 226, 227, 228, 229, 232, 233, H-21TU218, 219, 220, 221, 222, 223, 224, 225	V-2382-202
		H-21KU223A, 224A, 225A, 226A, 227A, 228A, 229A, 232A, 233A, H-21TU218A, 219A, 220A, 221A, 222A	V-2382-204
		H-21TU218B, 219B, 220B, 221B, 222B	V-2382-602
		H-21TU218C, 219C, 220C, 221C, 222C	V-2382-604

MANUFACTURER	Westinghouse Electric Corp., Television & Radio Div., Metuchen, N.J.	
TYPE SET	Television Receiver	
TUBES	Seventeen	
POWER SUPPLY	105-120 Volts AC, 60 Cycle	RATING 175 Watts, 1.6 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF,	Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

See "Alignment Instructions" on page 6.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 4 hex headed screws holding the top glass retainer bracket. These screws are located under the bottom edge of the escutcheon. Remove the bracket, tilt the safety glass out at the top and lift up to remove.

SPECIAL ADJUSTMENTS

A. Automatic Fine Tuning
To adjust the automatic fine tuning with an air signal, set the "Automatic-Manual" switch to "Automatic" position (fully counter clockwise). Tune in the strongest station in the area with the greatest amount of black area in the transmitted picture. Connect the DC probe of a VTVM to the side of the automatic fine tuning control which is not jumpered to the center terminal. Adjust the control for a .5 volt reading on the VTVM.

B. Sync
Turn the sync fully clockwise, then counter clockwise approximately 1/4 turn. Adjust picture to lock in with hold controls. If picture jitters, tears, etc. adjust sync counter clockwise until stable. Readjust hold controls and check operation on all channels in the area.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

For adjustment of the horizontal oscillator, it is necessary to remove the rear cover and supply power to set. Set the horizontal hold at the center of its range and adjust the horizontal frequency slug (B1) until the picture synchronizes horizontally. (For location, see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate audio detector buzz, adjust the quieting control for MINIMUM buzz and maximum sound. (For location, see tube placement chart).

FUSE DEVICE

A 7.5Ω fusible resistor (R109) is used for LV power supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by means of a centering arm. Adjust the arm from side to side, and up and down until the picture is properly centered.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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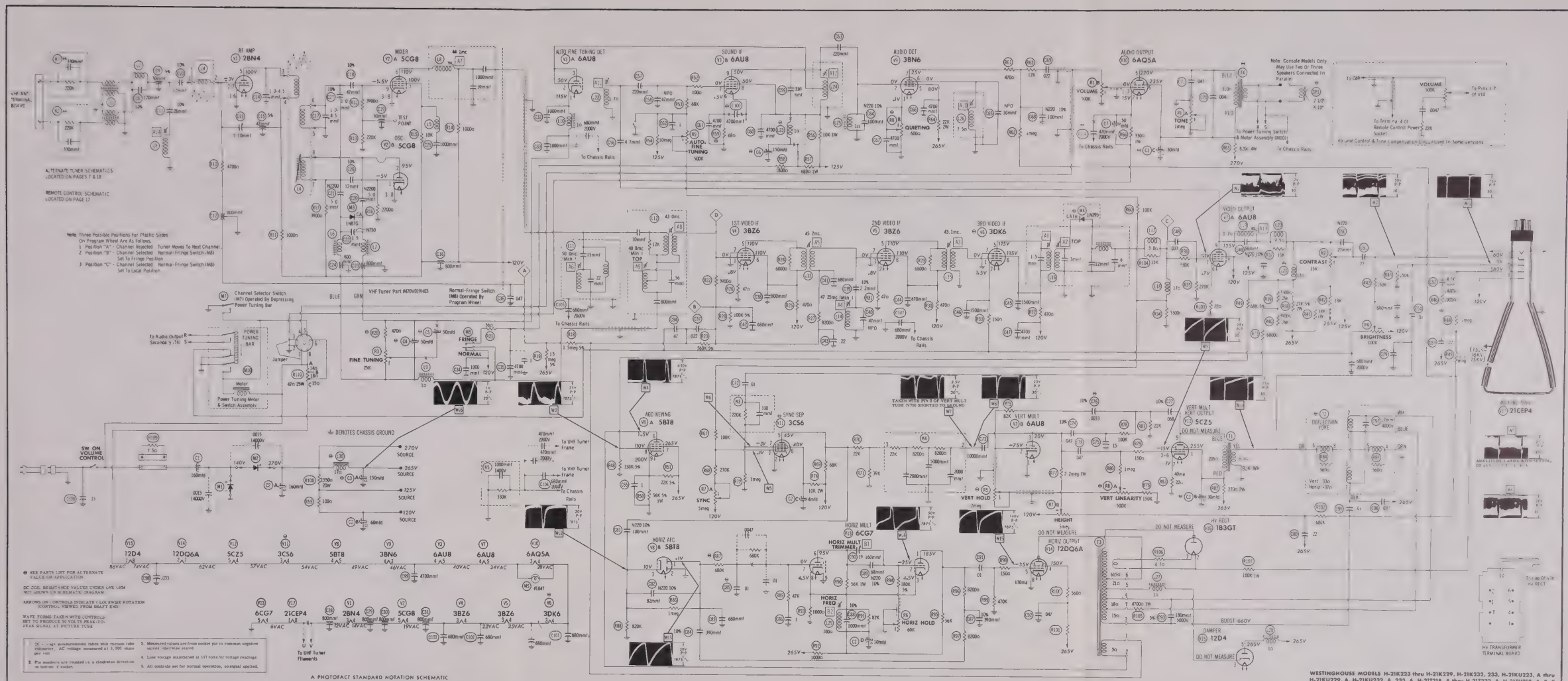
RF AMP V1 2BN4
MIXER V2A 5CG8
OSC V2B 5CG8
AUTO FINE TUNING DET V1A 6AU8
SOUND IF V3B 6AU8
AUDIO DET V3A 3BN6
AUDIO OUTPUT V10 6AQ5A
1ST VIDEO IF V4 3BZ6
2ND VIDEO IF V5 3BZ6
3RD VIDEO IF V6 3DK6
VIDEO OUTPUT V7A 6AU8
AGC KEYING V9A 5BT8
SYNC SEP V11 3CS6
HORIZ AFC V8B 5BT8
HORIZ MULT V13 6CG7
VERT MULT V7B 6AU8
VERT MULT VERT OUTPUT V12 5CZ5
HORIZ OUTPUT V14 12DQ6A
DAMPER V15 12D4
HV RECT V16 1B3GT
PIC TUBE 21CEP4
VHF ANT TERMINAL BOARD
ALTERNATE TUNER SCHEMATICS LOCATED ON PAGES 7 & 18
REMOTE CONTROL SCHEMATIC LOCATED ON PAGE 17
Note: Three Possible Positions for Plastic Slides On Program Wheel Are As Follows.
1 Position "A" - Channel Rejected Tuner Moves To Next Channel.
2 Position "B" - Channel Selected Normal-Fringe Switch (MB) Set To Fringe Position
3 Position "C" - Channel Selected Normal-Fringe Switch (MB) Set To Local Position
Channel Selector Switch (M7) Operated By Depressing Power Tuning Bar
VHF Tuner Part 8470V019H03
Normal-Fringe Switch (MB) Operated By Program Wheel
POWER TUNING BAR
Power Tuning Motor & Switch Assembly
FINE TUNING 25K
FRINGE
NORMAL
SW ON VOLUME CONTROL
DENOTES CHASSIS GROUND
270V SOURCE
265V SOURCE
125V SOURCE
120V SOURCE
To Audio Output Secondary (T4)
To Chassis Rails
To UHF Tuner Filaments
To VHF Tuner Frame
AUTO FINE TUNING 500K
QUIETING 600Ω
VOLUME 500K
TONE 1meg
BRIGHTNESS 100K
CONTRAST 15K
VERT HOLD 2meg
VERT LINEARITY 150K
HEIGHT 5meg
HORIZ HOLD 60K
HORIZ MULT TRIMMER
HORIZ FREQ
DO NOT MEASURE
BOOST 660V
Note Console Models Only May Use Two Or Three Speakers Connected In Parallel
To Power Tuning Switch & Motor Assembly (M10)
To Pins 1-7 of V10
To Pin 4 of Remote Control Power Socket
Volume Control & Tone Compensation Circuit Used In Some Versions
To CR6
To Pin 2 of V16 HV RECT
HV TRANSFORMER TERMINAL BOARD
SEE PARTS LIST FOR ALTERNATE VALUES OR APPLICATION
DC COIL RESISTANCE VALUES UNDER EACH COIL NOT SHOWN ON SCHEMATIC DIAGRAM
ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION CONTROL VIEWED FROM SHAFT END
WAVE FORMS TAKEN WITH CONTROLS SET TO PRODUCE 80 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE
DC voltage measurements taken with vacuum tube voltmeter. AC voltage measured at 1,000 ohms per volt.
Pin numbers are counted in a clockwise direction on bottom of socket.
Measured values are from socket pin to common negative unless otherwise stated.
Line voltage maintained at 117 volts for voltage readings.
All controls set for normal operation, no signal applied.
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

WESTINGHOUSE MODELS H-21K223 thru H-21K229, H-21K232, 233, H-21KU223, A thru H-21KU229, A, H-21KU232, A, 233, A, H-21T218, A thru H-21T222, A, H-21TU218, A, B, C thru H-21TU222, A, B, C (Ch. V-2372-27, -67, V-2382-202, -204, -602, -604)

TUBE PLACEMENT CHART

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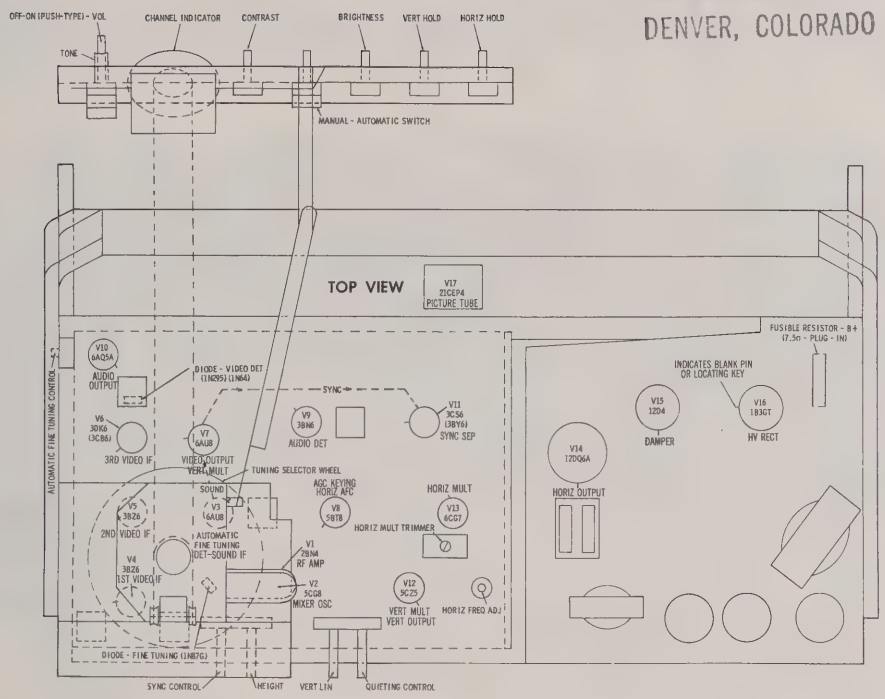


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

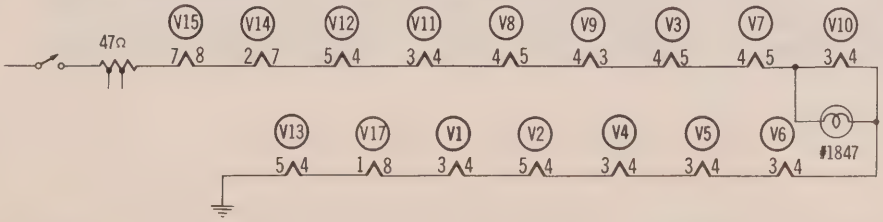
POWER SUPPLY FAILURE
No raster, no sound - **Fusible Resistor (R109), Rectifier (M1, M2)**

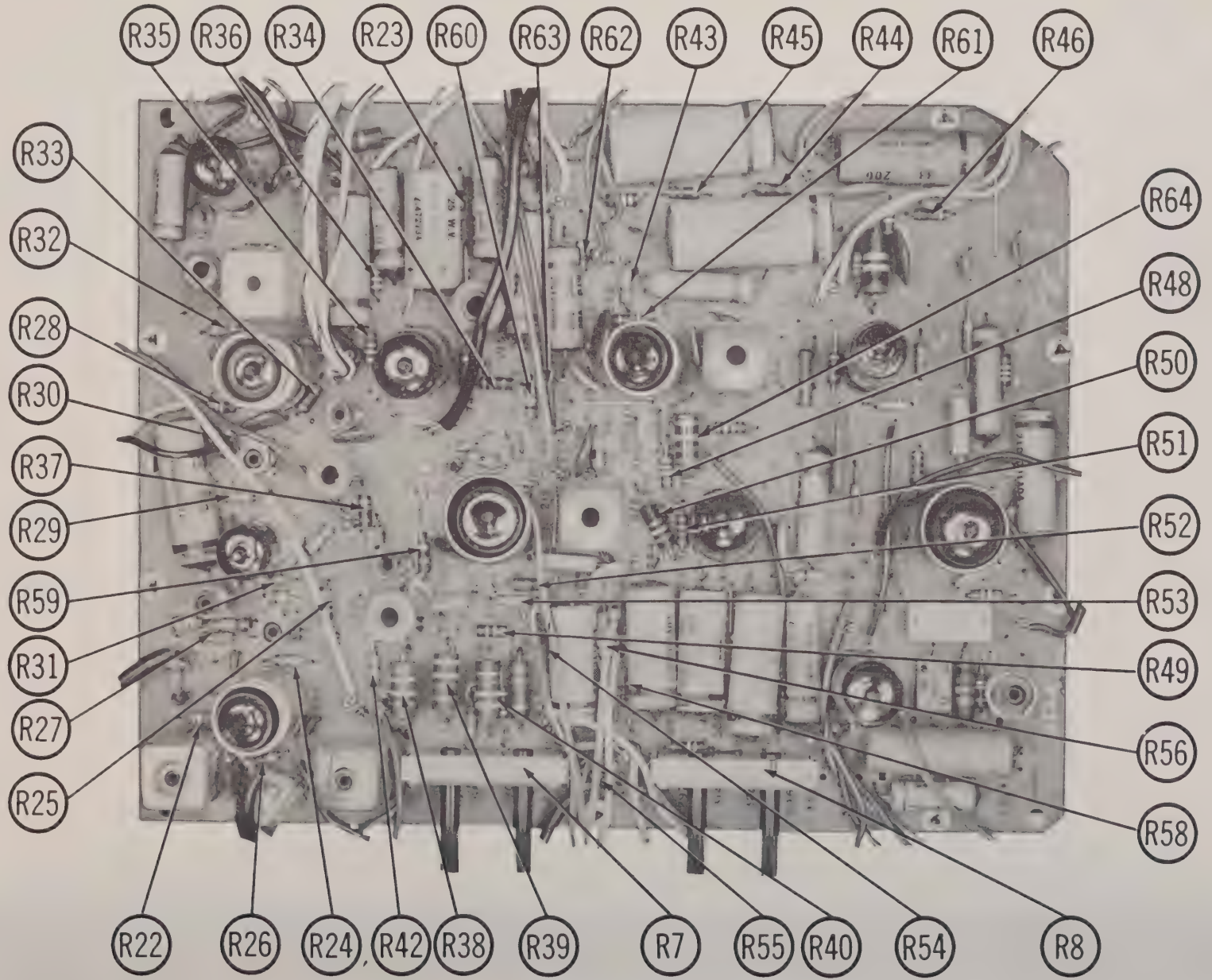
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V4, V5, V6, Diode (M4), V7**
No pic, no sound, has snow - **V1, V2, V4**
No pic, has sound, has raster - **V7, V17**
Has pic, no sound - **V3, V9, V10**
Overloaded picture - **V8**

SYNC FAILURE
No vert. sync - **V11**
No horiz. sync - **V11, V8**
No vert. or horiz. sync - **V11**

SWEEP FAILURE
No raster, has sound - **V8, V13, V14, V15, V16, V17**
No vertical deflection - **V7, V12**
Poor vert. linearity or foldover - **V7, V12**
Poor horiz. linearity or foldover - **V13, V14, V15**
Narrow picture - **V13, V14, V15, M1, M2**
Vert. off freq. - **V7, V12**
Horiz. off freq. - **V13**

This receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative. (See circuit below).





RESISTOR IDENTIFICATION (R22-R64)

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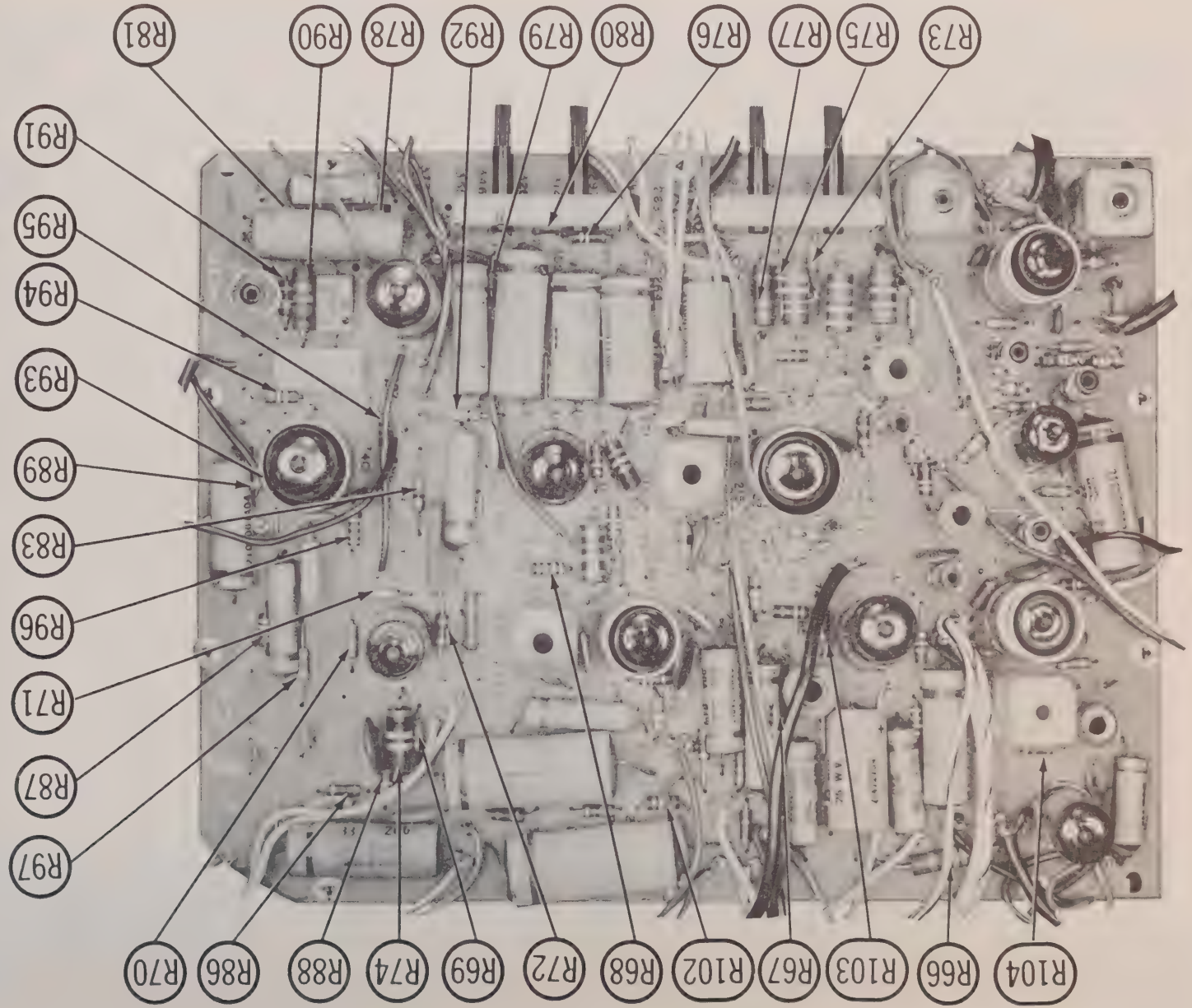
RESISTOR IDENTIFICATION (R66-R104)



ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.

VIDEO IF ALIGNMENT

Connect the negative lead of a 12 volt bias supply to point (A). Positive to chassis.
Connect the negative lead of a 4 volt bias supply to point (B). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to pin 1 (grid) of 3rd. Video IF amp. (V6). Low side to chassis.	43.9MC (10MC Swp)	43.9MC	Any non-interfering channel	Vert. Amp. thru 47K to point (C). Low side to chassis.	A1, A2	Adjust for maximum gain and symmetry of response similar to Fig. 1 with markers as shown. Detune A7, A8 and A9.
2.	"	High side to point (D). Low side to chassis.	Not used	43.1MC	"	USE VTVM. DC probe thru 47K to point (C). Common to chassis.	A3	Adjust for maximum deflection. Use only enough generator output to provide a usable indication on VTVM.
3.	"	"	"	47.25MC	"	"	A4	Adjust for MINIMUM deflection.
4.	"	"	"	45.2MC	"	"	A5	Adjust for maximum deflection.
5.	"	"	44MC (10MC Swp)	41.25MC 42.25MC 43.0MC 45.0MC 45.75MC 47.25MC	"	Vert. Amp. thru 47K to point (C). Low side to chassis.		Retouch A3 and A5 for response similar to Fig. 2.
6.	"	High side to ungrounded tube shield floating over mixer-osc. tube (V2). Low side to chassis.	Not used	50.0MC	13 (Set to fringe area)	USE VTVM. DC probe thru 47K to point (C). Common to chassis.	A6	Switch set for manual fine tuning. Adjust for MINIMUM deflection. If necessary, increase signal level or remove bias to obtain indication on VTVM. If interference exists from adjacent channel sound, adjust A6 for MINIMUM at 47.25MC.
7.	"	"	"	44.1MC	"	"	A7	Adjust for maximum deflection. Use only enough generator output to provide a usable indication on VTVM.
8.	"	"	"	43.0MC	"	"	A8	"
9.	"	"	"	40.8MC	UHF (Set to local position)	"	A9	Adjust for MINIMUM deflection. (If necessary, increase signal level or remove bias to obtain indication on VTVM).
10.	"	"	44.0MC (10MC Swp)	41.25MC 45.75MC	12 (Set to local position)	Vert. Amp. thru 47K to point (C). Low side to chassis.		Check for response curve similar to Fig. 3 with markers as shown. If necessary, retouch A7 for desired results.

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
12.	.005mfd	High side to point (C). Low side to chassis.	4.5MC (400Ω FM 15KC Swp)	Any non-interfering channel	High impedance AC voltmeter or scope across the volume control (R1B).	A10	Using a strong signal, adjust A10 for maximum output.
13.	"	"	"	"	"	A11, A12	Adjust for maximum deflection. Use only enough generator output to provide a usable indication on VTVM.
14.	"	"	4.5MC (400Ω AM 30% Mod.)	"	"	R8B	Adjust generator output to provide 1½ volts RMS at pin 2 (grid) of 3BN6 (V9). Adjust quieting control (R8B) for MINIMUM AM output across volume control.

4.5MC TRAP ALIGNMENT

Tune in a strong TV station and adjust the fine tuning until a 4.5MC beat interference pattern is visible in picture and adjust A13 for MINIMUM beat pattern in the picture.

VHF OSCILLATOR ALIGNMENT

Connect an 1800Ω resistor across C4 or C5. If the tuner is a 470V019H05 or 470V019H03 with a red dot, use a 1200Ω resistor.
Turn the manual-automatic switch fully counter clockwise to automatic. Then turn the control clockwise to manual, but leave the control just past the click of the switch. (It is necessary to have the control in the manual position, but at maximum resistance).
The oscillator slugs are accessible thru a hole in the front of the tuner one at a time, as the channel selector is rotated. Turn the slug clockwise until sound bars appear in the picture, then turn counter clockwise to the point of best picture detail. Repeat this procedure for each station operating in the area. Remove the resistor from across C4 or C5.

RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

ANTENNA TRAP

If interference is noted on any channel, adjust A14 for MINIMUM interference.

ALIGNMENT INSTRUCTIONS (cont)

UHF ALIGNMENT

Connect the negative lead of a 3 volt bias supply to point Ⓑ. Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
15.	Fig. 4	Across UHF antenna terminals thru matching network (Fig. 4).	605MC (10MC Swp)	603.25MC 607.75MC	36	Vert. Amp. thru 47K to point Ⓒ. Low side to chassis.	A15	Adjust for response curve similar to Fig. 5. Check response at the high and low ends of UHF band. The response should be within the limits shown in Fig. 5.

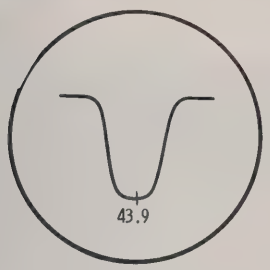


FIG. 1

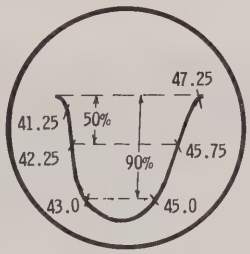


FIG. 2

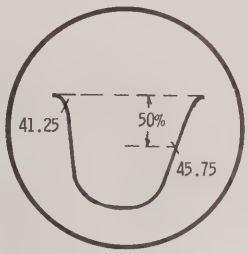
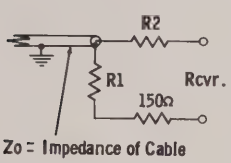


FIG. 3



Zo	R1	R2
50Ω	56Ω	120Ω
75Ω	82Ω	110Ω

FIG. 4

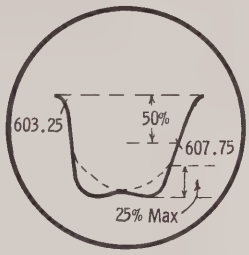
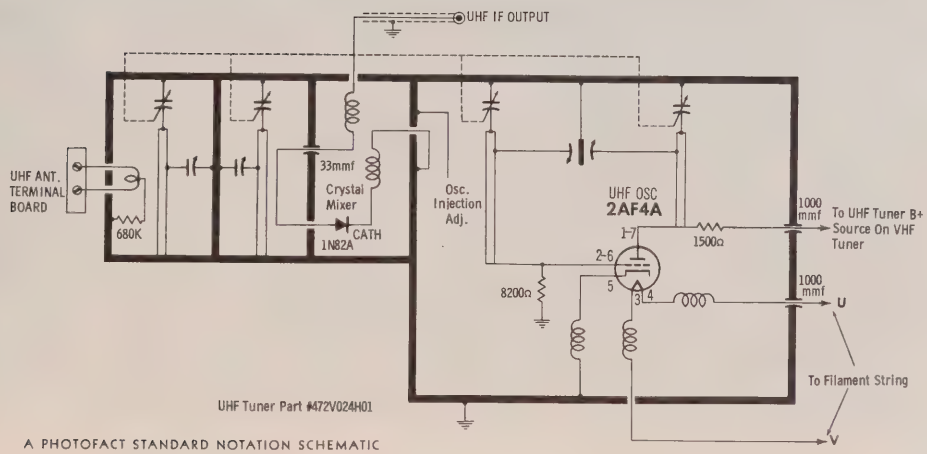


FIG. 5

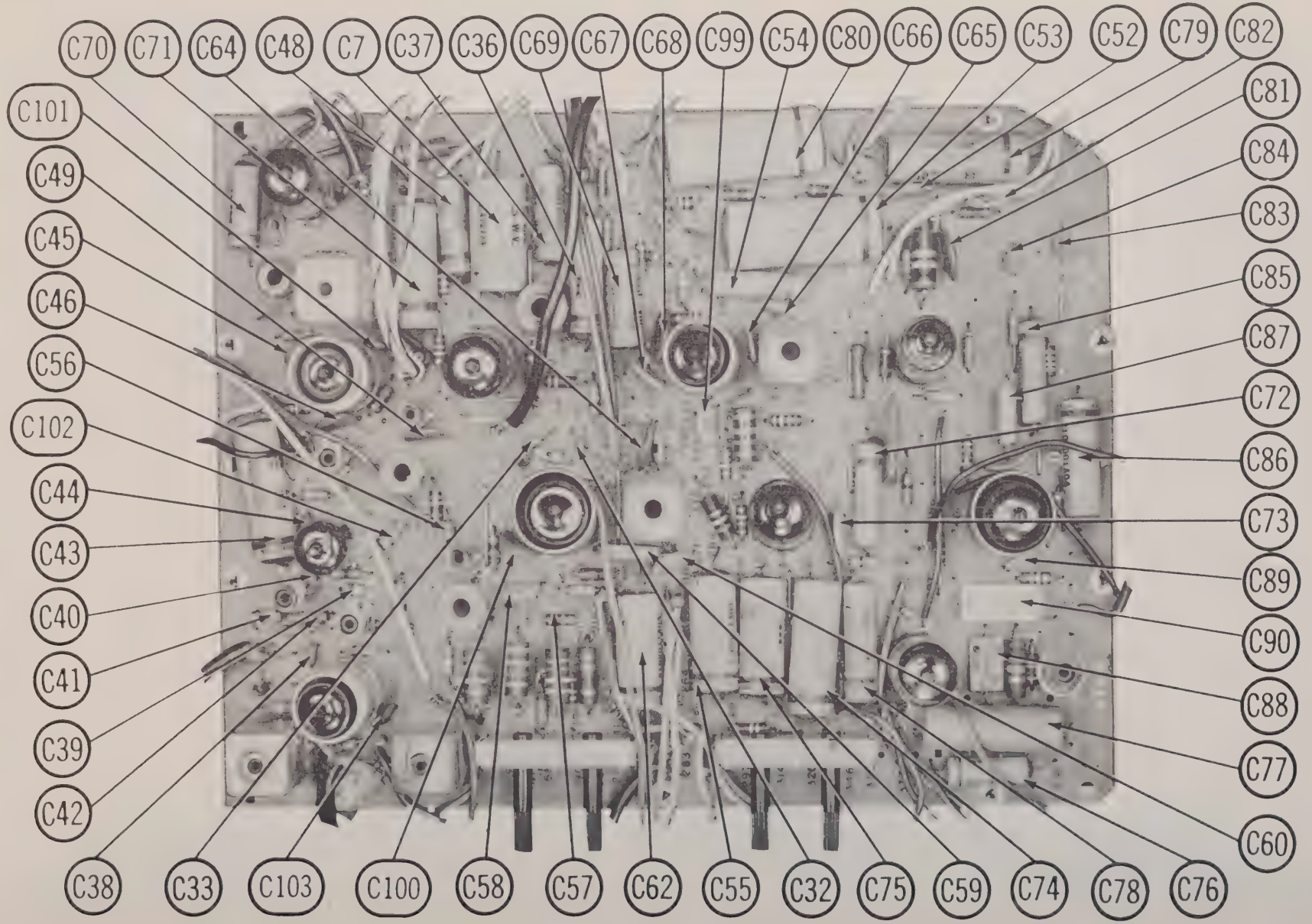


A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

ALTERNATE TUNER SCHEMATIC

WESTINGHOUSE MODELS H-21K223 thru H-21K229, H-21K232, 233, H-21KU223, A thru H-21KU229, A, H-21KU232, A, 233, A, H-21T218, A thru H-21T222, A, H-21TU218, A, B, C thru H-21TU222, A, B, C (Ch. V-2372-27, -67, V-2382-202, -204, -602, -604)

FOLDER 3



CAPACITOR IDENTIFICATION

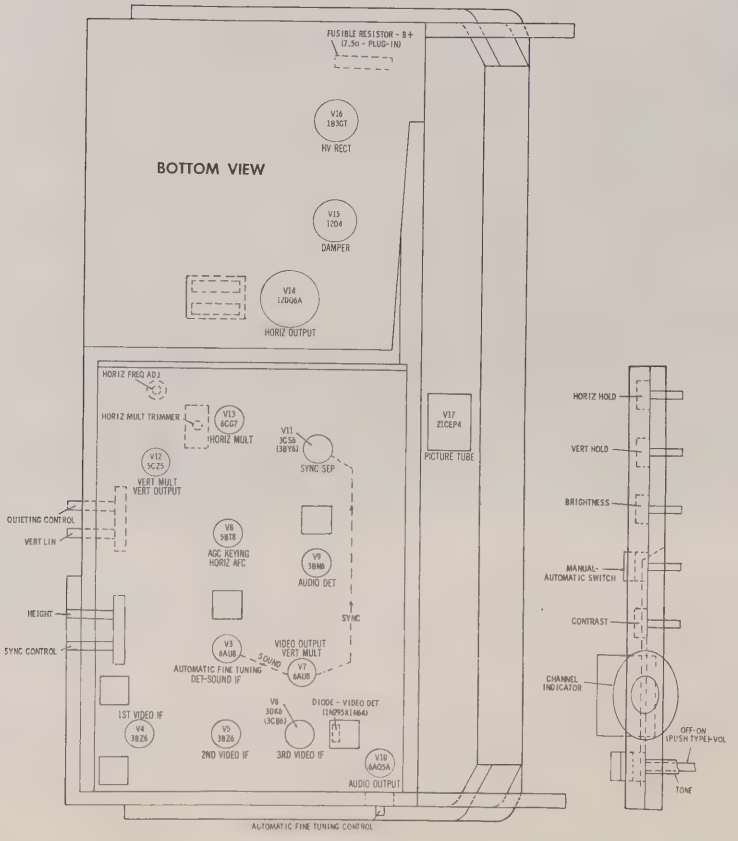
3924 MEADE ST.
DENVER, COLORADO

INDUCTOR AND ALIGNMENT IDENTIFICATION

RESISTANCE MEASUREMENTS

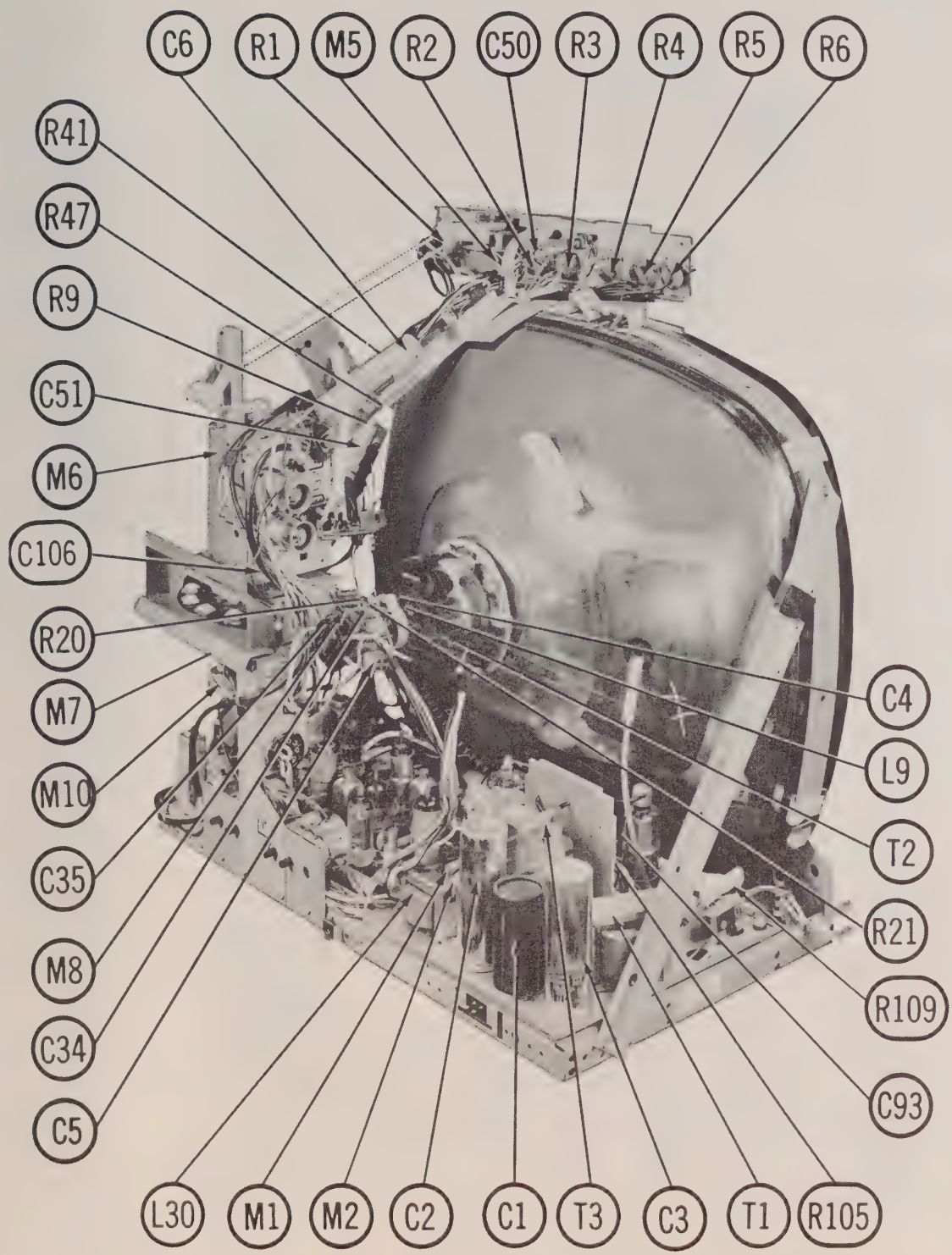
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	2BN4	0Ω	2.1meg	3Ω	3.5Ω	†1600Ω	0Ω	2.1meg		
V2	5CG8	2700Ω	†5500Ω	0Ω	4.5Ω	3.5Ω	†1600Ω	†11K	0Ω	220K
V3	6AU8	†2400Ω	†11K	†11K	10.5Ω	9.5Ω	68Ω	68K	†11K	†11K
V4	3BZ6	100K	47Ω	4.5Ω	5.5Ω	†2100Ω	†2100Ω	0Ω		
V5	3BZ6	100K	47Ω	5.5Ω	6.5Ω	†2100Ω	†2100Ω	0Ω		
V6	3DK6	.1Ω	150Ω	6.5Ω	7.5Ω	†2100Ω	†2100Ω	0Ω		
V7	6AU8	0Ω	•1.2meg	• ‡3.7meg	9.5Ω	8.5Ω	22Ω	140K	†1600Ω	†4800Ω
V8	5BT8	1.8meg	0Ω	820K	12Ω	11Ω	600K	†0Ω	60K	
V9	3BN6	• 30Ω	1Ω	10.5Ω	11Ω	†22K	7.5Ω	†1meg		
V10	6AQ5A	0Ω	330Ω	8.5Ω	7.5Ω	†1100Ω	†840Ω	0Ω		
V11	3CS6	70K	0Ω	13Ω	12Ω	†35K	†11K	1meg		
V12	5CZ5	†270Ω	NC	•1.2meg	13Ω	14Ω	•1.2meg	22Ω	0Ω	†475
V13	6CG7	†57K	• 200K	1000Ω	1.5Ω	0Ω	†57K	2.5meg	1000Ω	0Ω
V14	12DQ6A	NC	17Ω	NC	†12K	470K	TP	14Ω	0Ω	TOP CAP ‡22Ω
V15	12D4	NC	NC	¶	NC	†1Ω	NC	20Ω	17Ω	
V16	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡637Ω
V17	21CEP4	1.5Ω	150K	‡3.2meg	†1600Ω	NC	150K	•170K	3Ω	

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 265V SOURCE.
‡ MEASURED FROM PIN 3 OF V15.
NC NO CONNECTION.
TP TIE POINT.

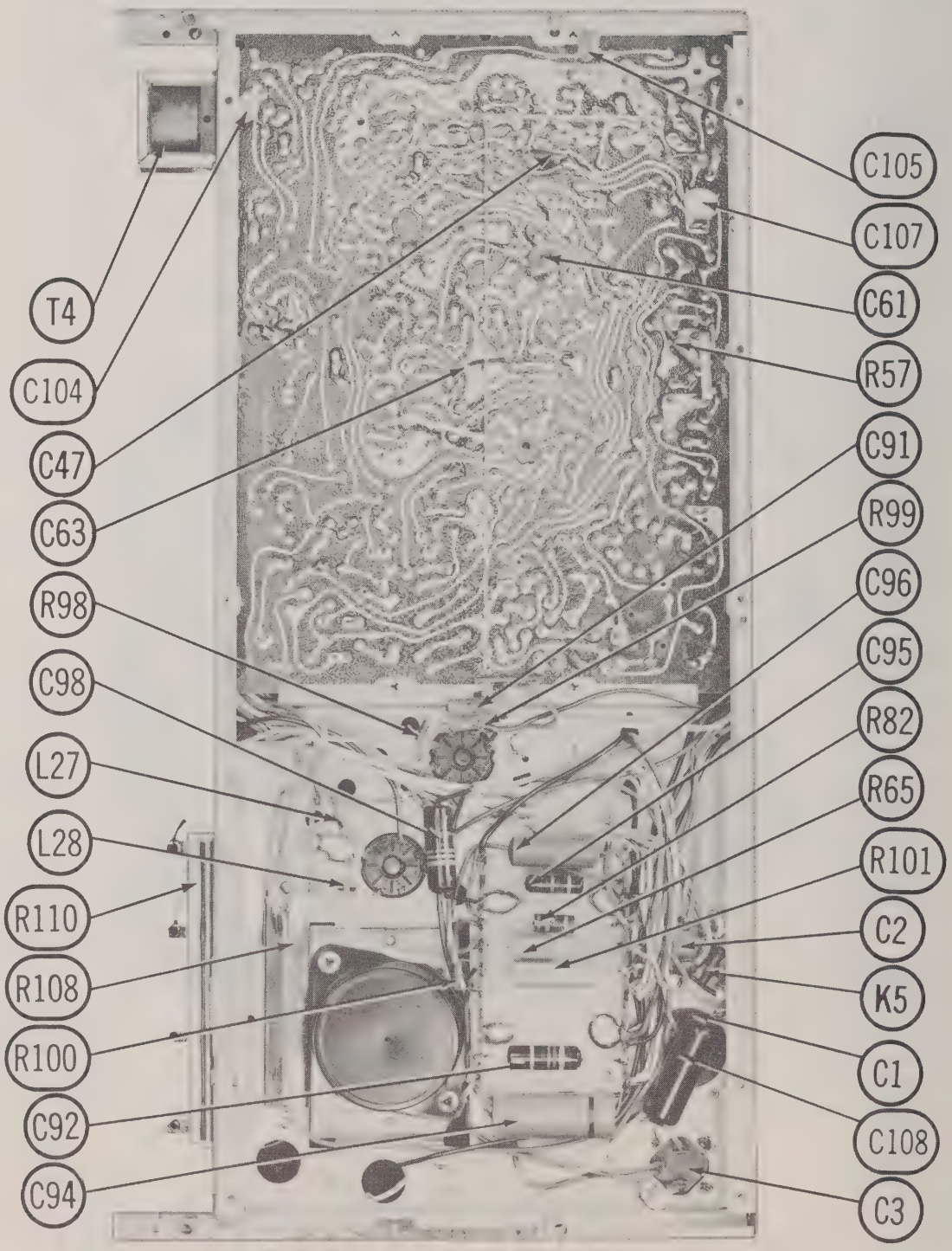


TUBE PLACEMENT CHART

...Y OF
...ANKENSHIP
...24 MEADE ST.
DENVER, COLORADO



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	2BN4	
V2	Mixer-Osc.	5CG8	
V3	Automatic Fine Tuning Det. - Sound IF Amp.	6AU8	
V4	1st. Video IF Amp.	3BZ6	
V5	2nd. Video IF Amp.	3BZ6	
V6	3rd. Video IF Amp.	3DK6	Note 1
V7	Video Output-Vert. Mult.	6AU8	
V8	AGC Keying-Horiz. AFC	5BT8	
V9	Audio Det.	3BN6	
V10	Audio Output	6AQ5A	
V11	Sync Sep.	3CS6	Note 2
V12	Vert. Mult.-Vert. Output	5CZ5	
V13	Horiz. Mult.	6CG7	
V14	Horiz. Output	12DQ6A	
V15	Damper	12D4	
V16	HV Rectifier	1B3GT	

Note 1. Some versions use a 3CB6 in this application.
Note 2. Some versions use a 3BY6 in this application.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

PICTURE TUBE

ITEM No.	REPLACEMENT DATA			NOTES
	Westinghouse PART No.	GENERAL ELECTRIC PART No.	SYLVANIA PART No.	
V17	21CEP4	21CEP4 ①	21CEP4 ② 21CEP4A ②	① Aluminized ② Silver screen "85"

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Westinghouse PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	160	200	218V021H01	AFH1-31-75	XA0266	FP131	TMS-34	S-200	TVL-1473
C2A	▲160	350	218V020H01	AFHS4-56-95	XD0695	FP419.65			TVL-4605.5
B	■60	300							
C	4	300							
D	▲10	300							
C3A	▲150	300	218V008H01 ①	AFH4-46-35		FP326.76		T-180	TVL-4574
B	■30	300						MTD-453	
C	▲30	300							
C4	50	25	218V019H01 ②	PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206
C5	50	25	218V019H01 ②	PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206
C6	150	300	①	PR1-100	BBRD0334	WS427	CDB-D-1014	S-200	R2025 *
C7	50	25	218V019H01	PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206

① In some versions C3A, B, C and C6 are combined in one unit (Part #218V041H01). In some versions C6 is not used.
② A single 100mfd @ 25V (Part #218V025H14) is used to replace C4 and C5 in some versions.
* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C8	120		690V004H17	NPO-DI 120	D6-211	L10T12	ED-120		5TCC-T12	10%
C9	30		690V004H18							5%
C10	28		690V004H20							10%
C11	12		690V004H19							10%
C12	800		690V004H23							
C13	5-10		690V004H22							
C14	1.0-4.5		690V004H24		829-6		532-B			
C15	47		690V004H25							5%
C16	800		690V004H23							
C17	1.0-4.5		690V004H24		829-6		532-B			
C18	47		690V004H26							10%
C19	30		690V004H18							
C20	5.0		690V004H21							N2200
C21	5.0		690V004H21							N2200
C22	1.5		V8749							N750
C23	800		690V004H23							
C24	800		690V004H23							
C25	1000		690V004H27	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C26	12		690V004H28							10%
C27	1.0		690V004H31	NPO-SI 1.0	TCZ-1		TCO-1.0		5TCCB-V1	10%
C28	800		690V004H23							
C29	800		690V004H23							
C30	800		690V004H23							
C31	800		690V004H23							
C32	1000		215V111A02	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C33	1000		215V111A02	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C34	1000		215V111A02	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C35	4700		215V104A72	BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5HK-D47	
C36	.047	400	210V014A73	P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
C37	.022	200	210V042A23	P288N-022	DD-203	CUB4S22	ED-02	GEM-4122	2TM-S22	
C38	800		215V300H18	BPD-0008	DD-801	L10T8	ED-0008			
C39	2.2		217V012A29	NPO-SI 2.2	TCZ-2R2	C10V22C	TCO-2.2		5TCCB-V22	10%
C40	47		215V300H06	NPO-DI 47	TCZ-47	C10Q47C	TCO-47		5TCC-Q47	NPO
C41	680		215V116A81	SI 680	D6-681	LT6T68	GP-680	UC-5368	5GA-T68	
C42	680		215V116A81	SI 680	D6-681	LT6T68	GP-680	UC-5368	5GA-T68	
C43	.22	200	210V002A24	P288N-22		CUB2P22		GEM-2022	2TM-P22	
C44	470		215V300H07	BPD-00047	DD-471	BYA10T47	ED-470	UC-5347	5GA-T47	
C45	1500		215V300H31	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C46	1500		215V300H31	BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C47	4700		215V300H04	BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5HK-D47	
C48	.033	200	210V003A33	P288N-033	DF-303	CUB6S33		GEM-4133	6TM-S33	
C49	56		215V015A60							N220 10%
C50	27		210V012A70							N220
C51	.22	400	210V012A24	P488N-22		CUB4P22		GEM-4022	4TM-P22	
C52	4700	1400	215V300H01	HVD-15-4700	DD30-472	HVE16D5	HD15-4700			
C53	.22	600	210V062A24	P688N-22		CUB6P22		GEM-6022	20HK-D5	
C54	.01	400	210V051A03	P488N-01	D6-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
C55	.1	400	210V011A04	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C56	4.7		217V014A79	NPO-SI 4.7	TCZ-4R7	C10V47C	TCO-4.7	ZT-5547	5TCCB-V47	

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	Westinghouse PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
CS7	220		2SV033AJ8	BPD-00023	DD-221	LU7T33	ED-220	UC-5323	5GA-T22	
CS8	47		2SV020S05	NPO-DI 47	TCE-47	CDQ47C	TCO-47		NTCC-Q47	NPO
CS9	330		2SV07YAJ1	465-00033	DB-331	5WT7J3	ED-330	UC-5333	3TM-333	
CS10	4700		2SV032S04	BPD-0047	DD-473	BYA10D4T	ED-0047	UC-5347	5EK-D47	
CS11	4700		2SV032S04	BPD-0047	DD-473	BYA10D4T	ED-0047	UC-5347	5EK-D47	
CS12	.1	400	2SV01AA04	P488N-I	DP-104			GEM-4141	4TM-P1	
CS13	330		2SV033AJ8	BPD-00023	DD-331	LU7T33	ED-330	UC-5333	5GA-T22	
CS14	300		2SV01AJ8							N330 10%
CS15	10		2SV030S36	NPO-DI 10	TCE-10	CDQ1C	TCO-10	ZT-541	5TCC-Q1	NPO
CS16	4700		2SV032S04	BPD-0047	DD-473	BYA10D4T	ED-0047	UC-5347	5EK-D47	
CS17	4700		2SV032S04	BPD-0047	DD-473	BYA10D4T	ED-0047	UC-5347	5EK-D47	
CS18	300		2SV01AS1							N330 10%
CS19	.022	400	2SV06AA23	P488N-G23	DP-303	CUB4S22	ED-03	GEM-4133	4TM-S32	
CS20	.0047	600	2SV06AA72	P488N-D047	DF-473	CUB4D47	GP-4700	GEM-4147	4TM-D47	
CS21	.047	400	2SV06AA73	P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
CS22	.01	400	2SV06AA51	P488N-01	DS-103	CUB4S10	GP-10000	GEM-411	4TM-S1	
CS23	10000		2SV10AJ03	BPD-01	DD-103	BYA8S1	ED-01	DC51	5SK-S1	
CS24	.047	600	2SV10AS03							10%
CS25	.10	200	2SV04AA54	P388M-15		CUB3P15		GEM-3015	3TM-P15	10% ①
CS26	.0033	600	2SV10S01							10% ①
CS27	.068	600	2SV10S06							10%
CS28	.047	400	2SV04AA73	P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
CS29	.33	200	2SV03AA54	P388M-33				GEM-3033	3TM-P33	
CS30	.33	400	2SV03AA54	P488M-33		CUBMP33		GEM-4033	4TM-P33	
CS31	300		2SV01AS							N330 10%
CS32	82		2SV03AA30							N330 10%
CS33	5600		2SV10S02	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
CS34	330		2SV20S03		DS-331	5S3T39	ED-390		M3-338	10%
CS35	.01	400	2SV06AA51	P488N-01	DS-103	CUB4S10	GP-10000	GEM-411	4TM-S1	②
CS36	.1	200	2SV01AA04	P388N-I	DP-104	CUB3P1		GEM-301	3TM-P1	
CS37	330		2SV03AJ8		DS-331	5S3T39	ED-330		M3-338	10%
CS38	1000		2SV07YAS2	1484-001		1S5T1	ED-1000	MCR355	3M5-2	10%
CS39	68		2SV01AS80							N330 10%
CS40	10-180		2TV50S01							
CS41	.01	400	2SV06AA03	P488N-01	DS-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
CS42	.047	400	2SV06AA73	P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
CS43	680	3000	2SV03GS37							5%
CS44	.47	200	2SV00AA74	P388M-47		CUB3P47		GEM-3047	3TM-P47	
CS45	.01	400	2SV06AA03	P488N-01	DS-103	CUB4S1	GP-10000	GEM-411	4TM-S1	
CS46	.033	600	2SV23AJ3	P488N-033	DF-303	CUB4S33		GEM-4133	4TM-S33	
CS47	33	4000								
CS48	.033	600	2SV13S03	P488N-033	DF-303	CUB4S33		GEM-4133	4TM-S33	
CS49	4700		2SV032S04	BPD-0047	DD-473	BYA10D4T	ED-0047	UC-5347	5EK-D47	
CS50	4700		2SV104S73	BPD-0047	DD-473	BYA10D4T	ED-0047	UC-5347	5EK-D47	① ②
CS51	680		2SV15AS8	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
CS52	680		2SV15AS8	RI 680	DS-681	LT6T68	ED-680	UC-5368	5GA-T68	
CS53	680		2SV15AS8	BPD-00068	DD-681	BYA10T68	ED-680	UC-5368	5GA-T68	
CS54	470	3000	2SV30GE30	HVD-30-470	DD30-471	HVB307T4	HD3-470	DC30347	30HXB-D1	① ③
CS55	680	3000	2SV30GE29	HVD-30-680	DD30-681	HVB307T6	HD3-680	DC30368		
CS56	680	3000	2SV30GE29	HVD-30-680	DD30-681	HVB307T6	HD3-680	DC30368		
CS57	680	3000	2SV30GE29	HVD-30-680	DD30-681	HVB307T6	HD3-680	DC30368		
CS58	.15	400	2SV01BH3	P488N-15		CUB4P15		GEM-4015	4TM-P15	

① Some versions use a .0027mfd ② 600V 10% (Part #210V10H13) in this application.
③ Not used in some versions

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	Westinghouse PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	27GV028H08				UR5648	
B	500K							Tone - Note 1
C	Switch							Volume - Note 1
R2A	1ESK	½	27GV031H04	B-30	A47-15K-S	BJ1-118		
B	Shaft			Not Req.	KS8-3	6KB		Contrast
R3A	3ESK	½	27GV034H01	B-37	A47-25K-Y		U36	Fine Tuning - Note 3
B	Shaft			Not Req.	KS8-3		Not Req.	
C	Switch				SWE-2		US-28	Manual & Automatic
R4A	100K	½	27GV032H03	B-62	A47-100K-S	GB1-138	TA3EL	Brightness
B	Shaft			Not Req.	KS8-3	Not Req.	Not Req.	
R5A	5meg	½	27GV032H05	B-75	A47-5meg-S	GB1-159	TA5EL	Vert. Hold - Note 3
B	Shaft			Not Req.	KS8-3	Not Req.	Not Req.	
R6A	90K	½	27GV032H01	B-35	A47-75K-S	GB1-135		Horiz. Hold
B	Shaft			Not Req.	KS8-3	Not Req.		
R7A	5meg	½	27GV035H03					Sync
B	5meg							Height
R8A	500K	½	27GV035H01					Vert. Lin. - Note 4
B	600Ω							Quieting - Note 4
R9A	50K	½	27GV032H04	BX-59	A47-500K-S	BJ1-133	SU-50	AFT
B	Shaft			Not Req.	KS8-1/4	TA1-Kit	Not Req.	

Note 1. Early production used a 50K tone, 500K volume with tap and switch part #27GV029H04.
Note 2. Some versions may use a 10E and switch (Part #27GV034H03) in this application.
Note 3. Alternate part #27GV032H08
Note 4. Alternate part #27GV035H03

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Westinghouse PART No.	NOTES
R11	47000		250V324A72	
R12	10000		250V22JA03	
R13	3900Ω		250V223A92	
R14	220K		250V323AJ4	
R15	10000		250V22JA03	
R16	10K		250V23JA03	
R17	2700Ω		250V222A72	
R18	3900Ω		250V223A92	
R19	1.5meg 5%		250V32JA55	
R20	15meg 5%		250V32JA56	
R21	470Ω		250V224A71	Note 1
R22	560		250V225A60	
R23	3900Ω		250V03SR02	
R24	560K 5%		250V35JA54	
R25	68000		250V903AL1	
R26	470Ω		250V224A71	
R27	8200Ω		250V03SR08	
R28	100K 5%		250V31JA54	
R29	6800Ω		250V903AL1	

ITEM No.	RATING OHMS	RATING WATT	Westinghouse PART No.	NOTES
R30	470Ω		250V324A71	
R31	47Ω		250V224A70	
R32	470Ω		250V323A71	
R33	150Ω		250V22JA51	
R34	33000Ω		250V323AJ2	
R35	270K		250V322A74	
R36	330K		250V323AJ3	
R37	10K		250V23JA03	
R38	37K 5%	2	250V41JA73	
R39	3300Ω	2	250V42JA32	
R40	3900Ω	2	250V42JA92	
R41	18K	1	250V32JA83	
R42	150K		250V32JA54	
R43	150K		250V32JA54	
R44	1meg		250V32JA05	
R45	2.5meg		250V32JA25	
R46	1000Ω		250V22JA02	
R47	18K		250V23JA83	
R48	350K 5%		250V23JA34	
R49	68K 5%		250V26A53	

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	Westinghouse PART No.	NOTES
R50	56K 5%	1	250V315A53	
R51	22K 5%		250V212A33	
R52	100Ω		250V23JA01	
R53	56K		250V226A53	
R54	10meg		250V32JA05	
R55	100Ω		250V23JA01	
R56	10K	1	250V33JA03	
R57	680Ω	1	250V326A81	
R58	1800Ω		250V32JA83	
R59	68Ω		250V326AJ0	Note 2
R60	100K		250V32JA04	
R61	470Ω		250V33AA75	
R62	1meg		250V32JA05	
R63	15K		250V32JA23	
R64	33K	3	250V32JA33	
R65	820Ω	4	251V03GH10	
R66	330Ω	1	250V22JA31	
R67	100K		250V32JA04	
R68	270K		250V322A74	
R69	68K		250V323AJ6	
R70	22K		250V223AJ3	
R71	39K		250V323AJ9	
R72	1meg		250V32JA05	
R73	6800Ω		250V226AS3	
R74	10K	2	250V42JA03	
R75	82K		250V325AJ3	
R76	150K		250V32JA54	
R77	2.5meg	1	250V32JA25	
R78	100K		250V32JA04	
R79	150Ω		250V31JA51	
R80	1meg		250V22JA05	
R81	82K		250V323AJ3	

ITEM No.	RATING OHMS	RATING WATT	Westinghouse PART No.	NOTES
R82	270Ω	2	250V432A70	
R83	12K		250V322AJ0	
R84	560Ω		250V225A61	
R85	560Ω		250V225AG1	
R86	1meg		250V32JA05	
R87	680K			Note 3
R88	820K		250V328AJ4	
R89	47K		250V324A73	
R90	56K	1	250V325AS3	
R91	82K		250V328AJ2	
R92	10000Ω		250V32JA03	
R93	10000Ω		250V33AA03	
R94	180K 5%		250V21JA84	
R95	56K		250V325AS3	
R96	82000Ω		250V328AS3	
R97	8200Ω		250V228AJ3	
R98	150Ω		250V22SJA1	
R99	470K		250V324A76	
R100	560Ω		250V22SAS1	
R101	12K	7	250V32HJ3	
R102	680K		250V328AS4	
R103	22Ω		250V22SAS0	
R104	15K		250V22SAS3	
R105	4700Ω	1	250V33AA72	
R106	4.7Ω		251V004A78	
R107	100K	1	259V003H09	
R108	150Ω	30	251V01EHJ	
R109	7.5Ω		259V003H01	
R110	47Ω	25	251V03EH01	
	1kΩ			
B	1kΩ			
C	1kΩ			

Note 1. When a 10K fine tuning control (R3) is used and the set is equipped with a VHF tuner, a 680Ω is used. If equipped with a UHF-VHF tuner a 100Ω is used in this application.
Note 2. Some versions may use a 56Ω (Part #250V326AS0) in this application.
Note 3. A 22K (Part #250V222A24) is used when the alternate circuit is used.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No	USE	REPLACEMENT DATA Westinghouse PART No.	Haldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	Vert. Output	430V039H01	Z1900 ①	MDF11	V307	A-8142 ①		A-108X	
T2A	Yoke-Horiz. (29.6kHz	490V006H01							
B	(100Vert.(53kHz)								
T3	Alt. Yoke	496V003H07							
M9	Rear Conver & Centering Device	78V010H01							
T3	Horiz. Output	483V003H06		HV0168		FLY-96 *			

① Connect as autoformer. Use 8 to 1 turns ratio.
③ Drill new mounting hole(s).

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Haldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
6					6	
5					5	4
4					4	
T					T	
3					3	
1					1	
2					2	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Westinghouse PART No.	Haldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T4	7500Ω	3-4Ω	430V036H01 ①	Z1113	A-2931	A-8134	34B52	S-7X	① Alternate part #430V054H01, 430V045H01

SPEAKER

ITEM No	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA Westinghouse PART No.	QUAM PART No	NOTES
SP1	2½"x10"	PM	3-4Ω	570V022H06 ①		① Used in Models H-2T218, A, 219, A, 220, A, 221, A, 223, A, H-2T221B, B, 219, B, 220, B, 221, B, 223, B
	8"	PM		570V036H03 ②		② Used in Models H-2K233, 234, 235, H-2UK223, 224, 225
	5"	PM		570V029H03 ③		③ Used in Models H-2K226, 227, 233, H-2UK226, 227, 233
	8"	PM		570V010H01 ④		④ Used in Models H-2K236, 239, 332, H-2UK228, 239, 332
	5"	PM		570V029H04 ⑤		⑤ Used in Models H-2K236, 239, 332, H-2UK228, 239, 332
	8"	PM		570V029H02 ⑥		⑥ Used in Models H-2K226, 227, 233, H-2UK226, 227, 233
	8"	PM		570V010H02 ⑦		⑦ Used in Models H-2K236, 239, 332, H-2UK228, 239, 332

COILS (RF-IF)

ITEM No.	USE	Westinghouse PART No.	NOTES
L1	Ant. Input Assy.	690V004H03	
L3	IF Trap	690V004H03	
L5	IF Trap	690V004H04	
L4A	Ant., RF, Mixer Grid, Osc. Coils	690V005H02	Channel 2
B	"	690V005H03	Channel 3
C	"	690V005H04	Channel 4
D	"	690V005H05	Channel 5
E	"	690V005H06	Channel 6
F	"	690V005H07	Channel 7
G	"	690V005H08	Channel 8

ITEM No.	USE	Westinghouse PART No.	NOTES
L4H	Ant., RF, Mixer Grid, Osc. Coils	690V005H09	Channel 9
I	"	690V005H10	Channel 10
J	"	690V005H11	Channel 11
K	"	690V005H13	Channel 12
L	"	690V005H13	Channel 13
L5	RF Choke	690V004H33	
L6	RF Choke	690V004H33	
L7	RF Choke	690V004H33	
L8	Mixer Plate Coil	690V004H06	

ITEM No.	USE	REPLACEMENT DATA Westinghouse PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L9	RF Choke	250V019H30	19-1006		4634		14 Microhenries
L10	RF Choke	250V019H20	19-1006		4634		14 Microhenries
L11	47.25MC Trap	250V034H01					Includes Assy.
L12	1st. Video IF	235V018U01					Includes 40.6MC Trap Assy.
L13	2nd. Video IF	235V030H01					
L14	47.25MC Trap	250V030H01					
L15	3rd. Video IF	235V030H02					
L16	4th. Video IF Assy.	235V005H01					
L17	Series Peaking Coil	250V034H03	19-3100	TV-194	6113	VP-3	100 Microhenries
L18	Shunt Peaking Coil	250V034H04	19-3500	TV-188	6174	VP-5	500 Microhenries
L19	4.5MC Trap	250V030H02					
L20	Series Peaking Coil	250V034H05	19-4301	TV-197	6154		200 Microhenries
L21	Shunt Peaking Coil	250V034H06	19-4400	TV-203	6136		400 Microhenries-Note 1
L22	1st. Sound IF	250V030H03					
L23	RF Choke	250V019H20	19-1006		4634		14 Microhenries-Note 2
L24	2nd. Sound IF	250V033H01					
L25	RF Choke	250V019H20	19-1006		4634		14 Microhenries
L26	Quadrature Coil	250V031H01					
L27	RF Choke	250V019H20	19-1006		4634		14 Microhenries
L28	RF Choke	250V019H20	19-1006		4634		14 Microhenries

Note 1. Some versions may use 500 Microhenries (Part #230V034H04) in this application
Note 2. Not used in some versions

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES PRI.	DC RES SEC.	REPLACEMENT DATA Westinghouse PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	NOTES
L29	100Ω		230V033H01						

FILTER CHOKE

ITEM No.	RATINGS TOTAL DIRECT CURRENT	RATINGS D.C. RESISTANCE	RATINGS INDUCTANCE @ CURRENT 1000 Cps	REPLACEMENT DATA Westinghouse PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L30	.210A	17Ω	5 Hy	430V032H03 ①	C6040	C-3994	C-3237	36C41	C-27X

① Alternate part #430V032H01.

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Westinghouse PART No.	REPLACEMENT DATA	
K1	Ant. Isolation	330mmf, 220V	690V004H01 ①	Centralab Sprague	RC-431 R-8179
K2	Ant. Isolation	330mmf, 220V	690V004H01 ①	Centralab Sprague	RC-431 R-8179
K3	Sync Peaking	330mmf, 220V	219V004H02	Centralab Sprague	RC-431 R-8179
K4	Vert. Integrator	2000mmf, 5000mmf, 5000mmf, 22K, 8200Ω, 8200Ω	210V003H01	Aerovox Centralab Cornell-Dubilier Erie Sprague	PA-110 PC-100 1S7ML 1406-01 Y-1
K5	Chassis Isolation	1000mmf ② 1400V, 330K	219V004H03	Sprague	R-8180

① Alternate part #219V004H03 may be used in this application.

RECTIFIERS

ITEM No.	RATING (Measured)	REPLACEMENT DATA Westinghouse PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No	SARKES TARZIAN PART No.	NOTES
M1	.350A	295V009H01 ①		1F24 ①	M500 ①	① Silicon
M2	.350A	295V006H01 ①		1F54 ①	M500 ①	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA Westinghouse PART No.	CBS PART No.	SYLVANIA PART No.	NOTES
M3	1N87G	295V003H03	1N80	1N80	Automatic Fine Tuning Det. (Pigtail)
M4	1N295 *		1N80	1N34A	Video Detector (Pigtail)
					* A 1N64 may be used in some versions.

MISCELLANEOUS

ITEM No.	PART NAME	Westinghouse PART No.	NOTES
M5	Pilot Light	756V50H02	#1847
M6	Tuner	470V018H09	VHF - Ch. V-2T72-2T, -67
	Tuner	470V018H05	VHF - Ch. V-2T72-2T, -67
	Tuner	470V032H03	VHF - Ch. V-2383-202, -602
	Tuner	470V021H05	VHF - Ch. V-2382-203, -602
	Tuner	470V020H03	VHF - Ch. V-2382-204, -604
	Tuner	472V034H01	UHF - Ch. V-2383-205, -605
	Tuner	472V034H03	UHF - Ch. V-2382-202, -602
	Tuner	472V035H01	UHF - Ch. V-2382-204, -604
M7	Switch	756V031H01	Channel Selector (Lead Type)
M8	Switch	756V04AH01	Normal-Fringe (Lead Type)
M9	Centering Device	78V010H01	Includes yoke cover
M10	Motor Assy	78TV052H01	Includes 3 section lead type switch

WESTINGHOUSE MODELS H-21K223 thru H-21K229, H-21K232, 233, H-21KU223, A thru H-21KU229, A, H-21KU232, 233, A, H-21TU218, A, B, C thru H-21TU222, A, B, C (Ch. V-2372-2T, -67, V-2382-202, -204, -602, -604)

FOLDER 3

PARTS LIST AND DESCRIPTIONS (Continued)

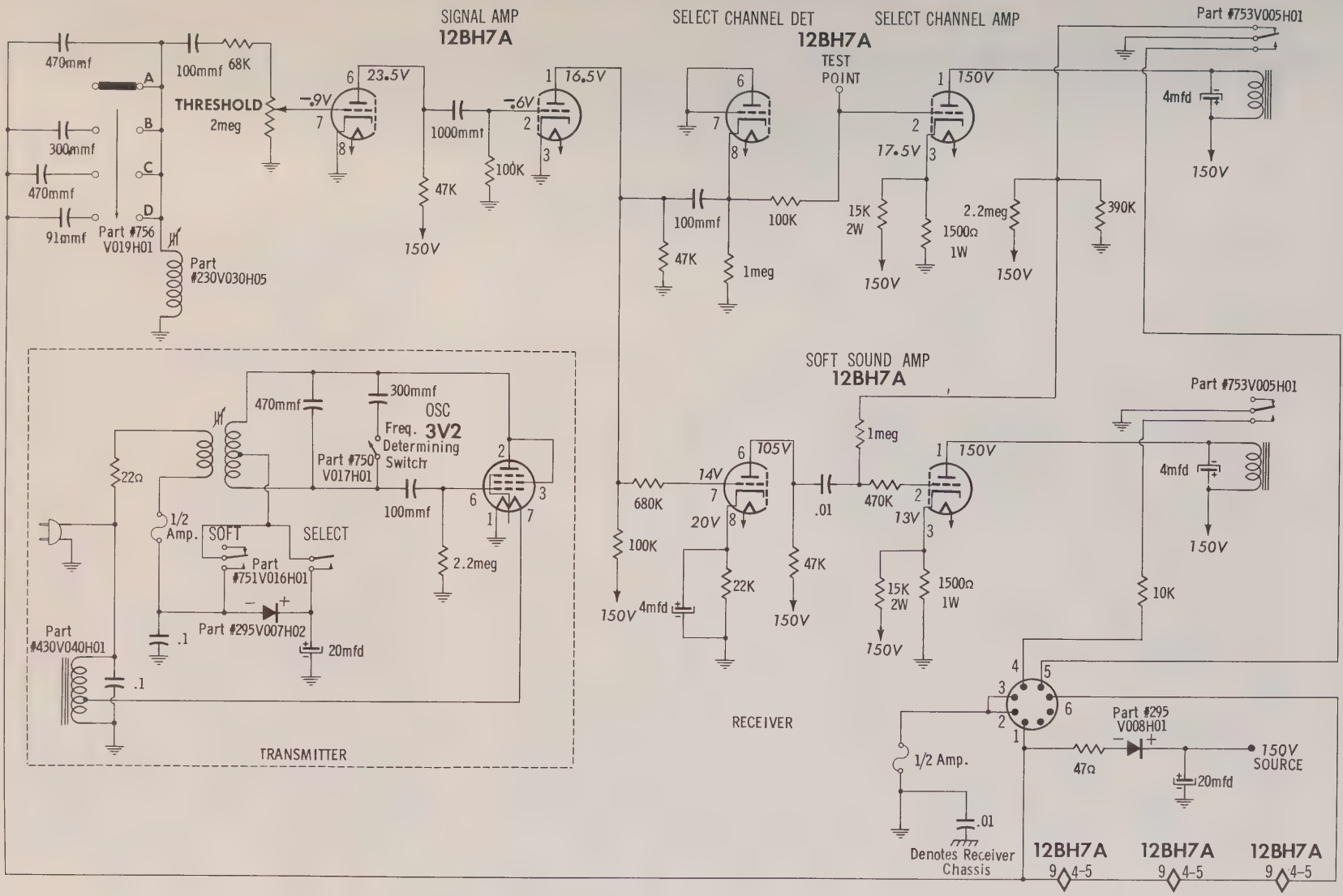
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Mask	610V007H02	
Escutcheon	555V013H04	Models H-21K223, 224, 225, 226, 227, 228, 229, 232, 233, H-21KU223, 224, 225, 226, 227, 228, 229, 232, 233
Escutcheon	555V013H03	Models H-21T218, A, 219, A, 220, A, 221, A, 222, A, H-21TU218, B, 219, B, 220, B, 221, B, 222, B
Knob	550V050H01	UHF Channel Selector - All UHF Models
Knob	550V044H02	Automatic Fine Tuning
Knob	550V045H01	On-off-volume
Knob	550V044H01	Horizontal, vertical, brightness, contrast
Knob	550V047H01	Tone
Dial	550V029H04	UHF
Cabinet	510V011H15	Models H-21T219, A
Cabinet	510V011H13	Models H-21T218, A
Cabinet	510V011H14	Models H-21TU218, B
Cabinet	510V011H16	Models H-21TU219, B
Cabinet	516V037H01	Models H-21T220, A
Cabinet	516V037H03	Models H-21TU220, B
Cabinet	516V037H02	Models H-21T221, A
Cabinet	516V037H04	Models H-21TU221, B
Cabinet	516V037H05	Models H-21T222, A
Cabinet	516V037H06	Models H-21TU222, B
Cabinet	516V040H01	Model H-21K226
Cabinet	516V040H03	Model H-21KU226
Cabinet	516V041H02	Model H-21K227
Cabinet	516V041H04	Model H-21KU227
Cabinet	516V042H01	Model H-21K228
Cabinet	516V042H04	Model H-21KU228
Cabinet	516V042H02	Model H-21K229
Cabinet	516V042H05	Model H-21KU229
Cabinet	516V042H03	Model H-21K232
Cabinet	516V042H06	Model H-21KU232
Cabinet	516V041H05	Model H-21K233
Cabinet	516V041H06	Model H-21KU233
Base	690V012H09	Swivel - Models H-21K227, H-21KU227
Base	690V012H10	Swivel - Models H-21K223, H-21KU223
Leg	690V012H12	Models H-21K228, H-21KU228
Leg	690V012H13	Models H-21K229, H-21KU229
Leg	690V012H14	Models H-21K232, H-21KU232
Leg	558V073H01	Models H-21K224, H-21KU224
Leg	558V073H02	Models H-21K225, H-21KU225
Leg	558V073H03	Models H-21K223, H-21KU223

WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

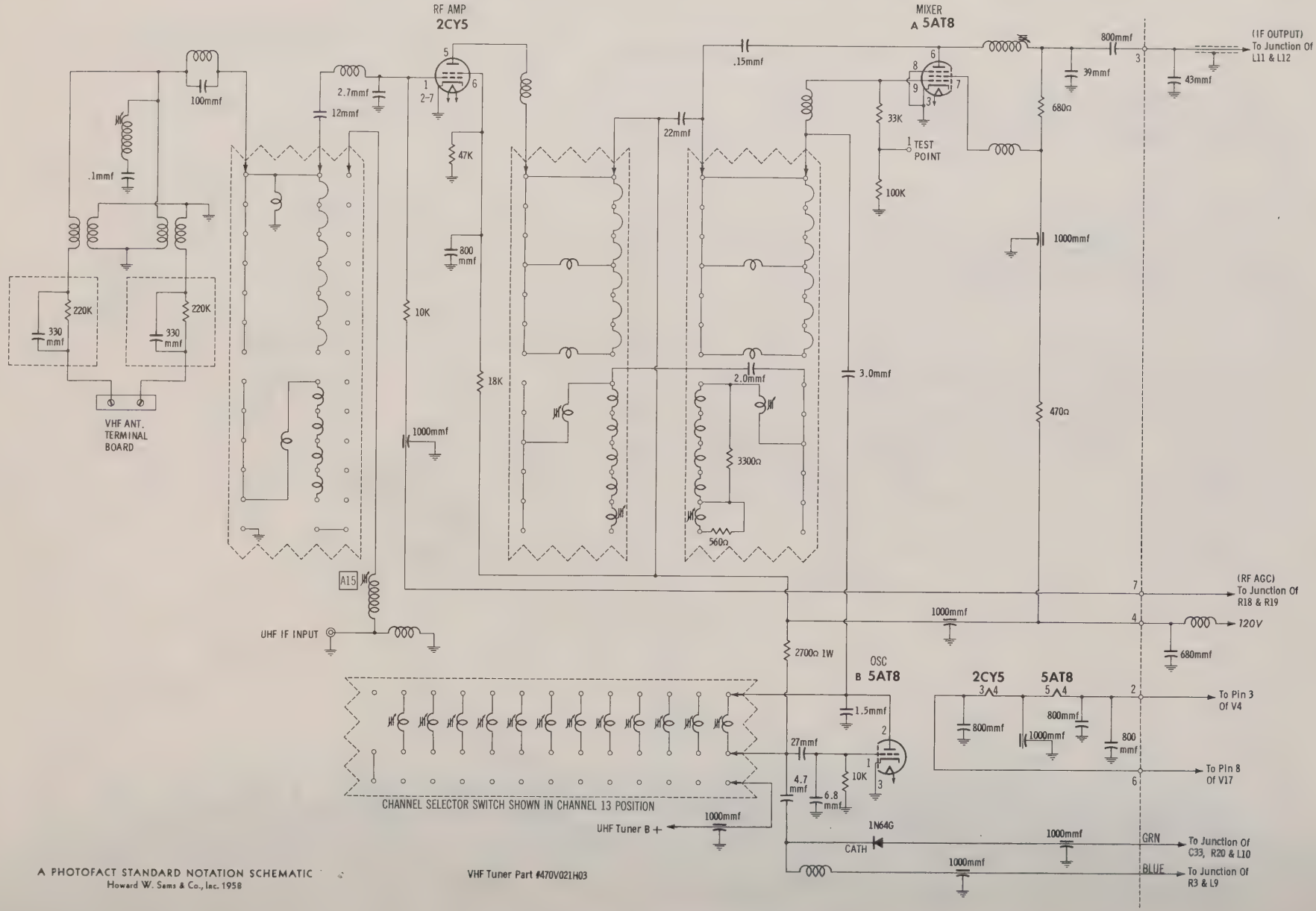


A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

Remote Control Transmitter (Part #H-988-1T) & Receiver (Part #H-988-1R), Used In Some Versions

REMOTE TUNING UNIT SCHEMATIC

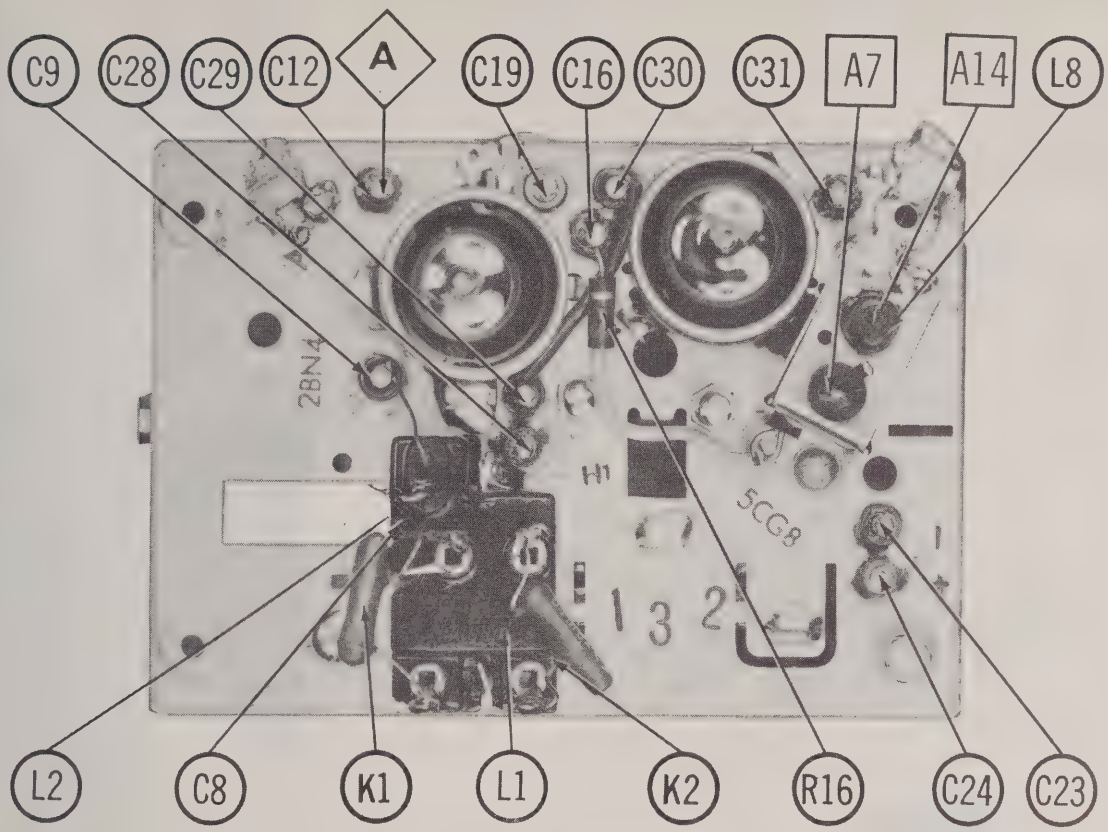
WESTINGHOUSE MODELS H-21K223 thru H-21K229, H-21K232, 233, H-21KU223, A thru H-21KU229, A, H-21KU232, A, 233, A, H-21T218, A thru H-21T222, A, H-21TU218, A, B, C thru H-21TU222, A, B, C (Ch. V-2372-27, -67, V-2382-202, -204, -602, -604)



A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

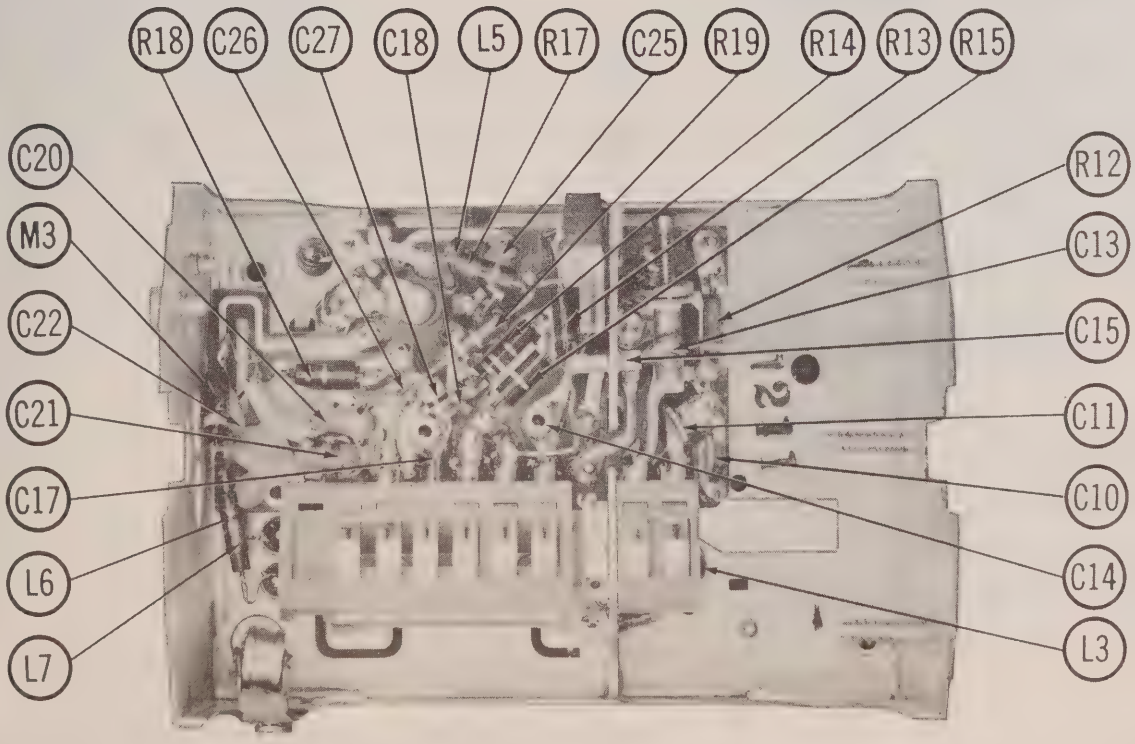
VHF Tuner Part #470V021H03

ALTERNATE TUNER SCHEMATIC

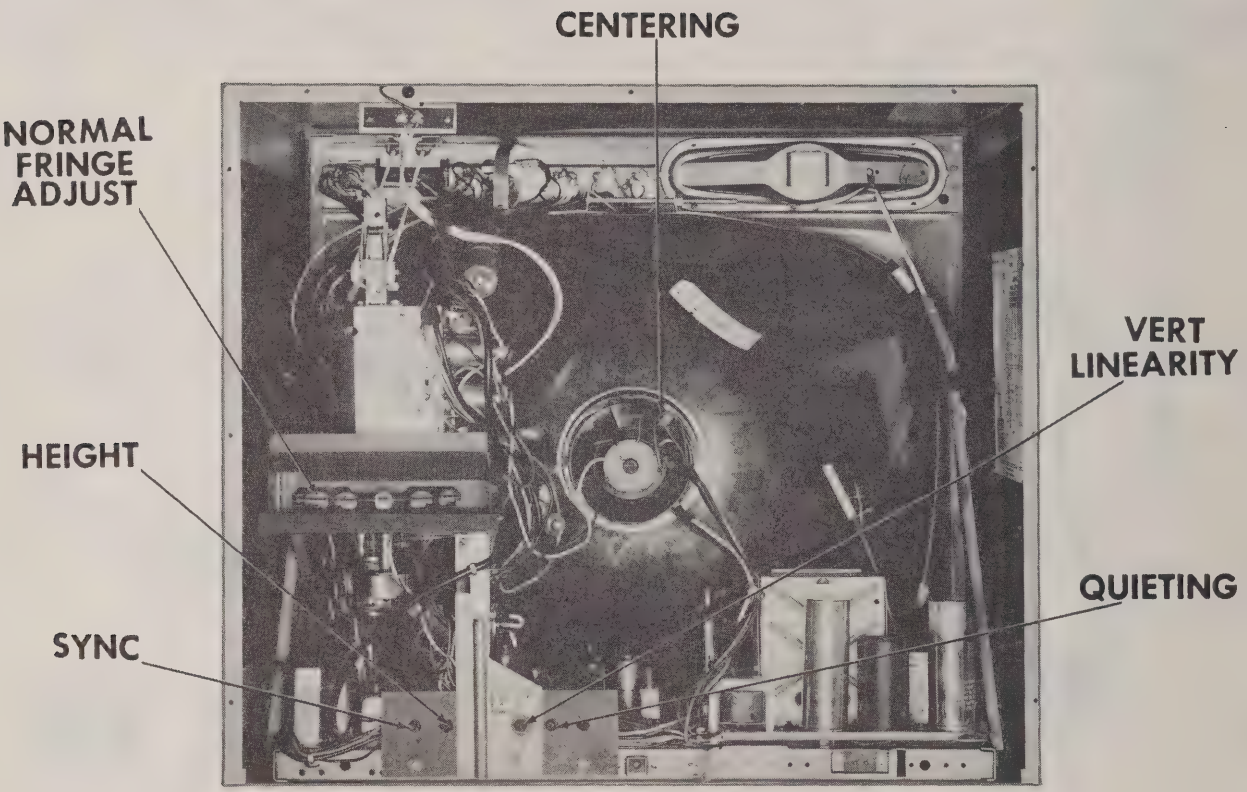


RF TUNER-TOP VIEW

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO



RF TUNER-BOTTOM VIEW



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Connect a short clip lead across the horizontal frequency coil (L29).

Set the horizontal hold control to the center of its range.

Connect the DC probe of the VTVM to pin 7 (grid) of the horizontal multivibrator tube (V13). Common to chassis.

With the receiver tuned to a TV station, adjust the horizontal mult. trimmer (B1) for zero voltage. If zero voltage can be approached, but not quite reached at one extreme of B1 adjustment, set the horizontal hold control SLIGHTLY to one side of mid-position to obtain zero voltage.

Remove the clip lead from L29 and adjust the horizontal frequency slug (B2) for zero voltage on the VTVM. Check the adjustment by switching off channel and back again. If the receiver does not pull into sync, repeat procedure.

Remove the VTVM connections.

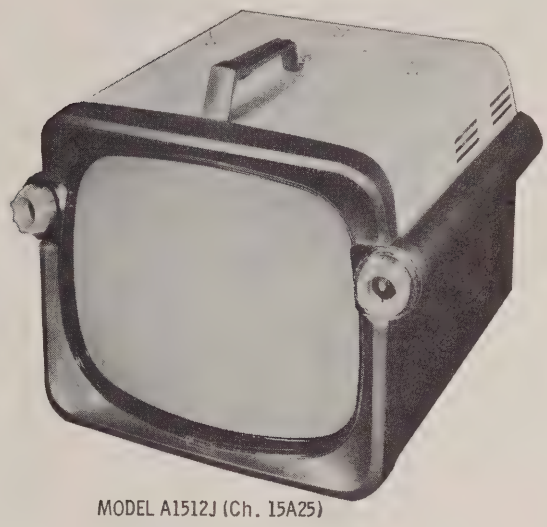
PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

ZENITH MODELS A1510L, LU, A1511G, GU, A1512J, JU, A1515W, WU (Ch. 15A25, U)

ZENITH MODELS A1510L, LU, A1511G, GU, A1512J, JU, A1515W, WU (Ch. 15A25, U)



MODEL A1512J (Ch. 15A25)

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 push-on type knobs from the top.

2. Remove 8 metal screws holding the rear cover. Remove the rear cover.

3. Remove 4 metal screws from the rear of the cabinet holding the top and bottom chassis rails.

4. Remove the chassis from the front.

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TRADE NAME	Zenith	MODELS	CHASSIS
		A1510L, A1511G, A1512J, A1515W	15A25
		A1510LU, A1511GU, A1512JU, A1515WU	15A25U
MANUFACTURER	Zenith Radio Corp., 6001 Dickens Ave., Chicago 39, Illinois		
TYPE SET	Television Receiver		
TUBES	Fifteen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 125 Watts, 1.2 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF oscillator is possible by removing the channel selector and fine tuning knobs. Set the fine tuning at the center of its range. The adjustments (located in a circle around the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 13 adjustment is located at 12 o'clock, proceed in a counter clockwise direction adjusting for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 3 push-on type knobs from the front. Remove the 6 metal screws holding the 2 escutcheons under the knobs. Tilt glass out at the top and lift up to remove. CAUTION: DO NOT break glass lip on bottom edge of the safety glass.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. Focus
Adjust the ion trap for the best focus consistent with maximum brightness.

C. Width
The width may be varied by means of a metallic sleeve located between the yoke and the picture tube neck. Adjust sleeve in or out of the yoke for a picture SLIGHTLY larger than necessary to fill the screen.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENT

For adjustment of the horizontal oscillator it is necessary to remove the rear cover and supply power to the set. Set the horizontal hold to the center of its range and adjust the horizontal hold (coarse) until the picture synchronizes horizontally. (For location, see tube placement chart).

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate audio detector buzz, adjust the buzz control for MINIMUM buzz and maximum sound. (For location, see tube placement chart).

FUSE DEVICE

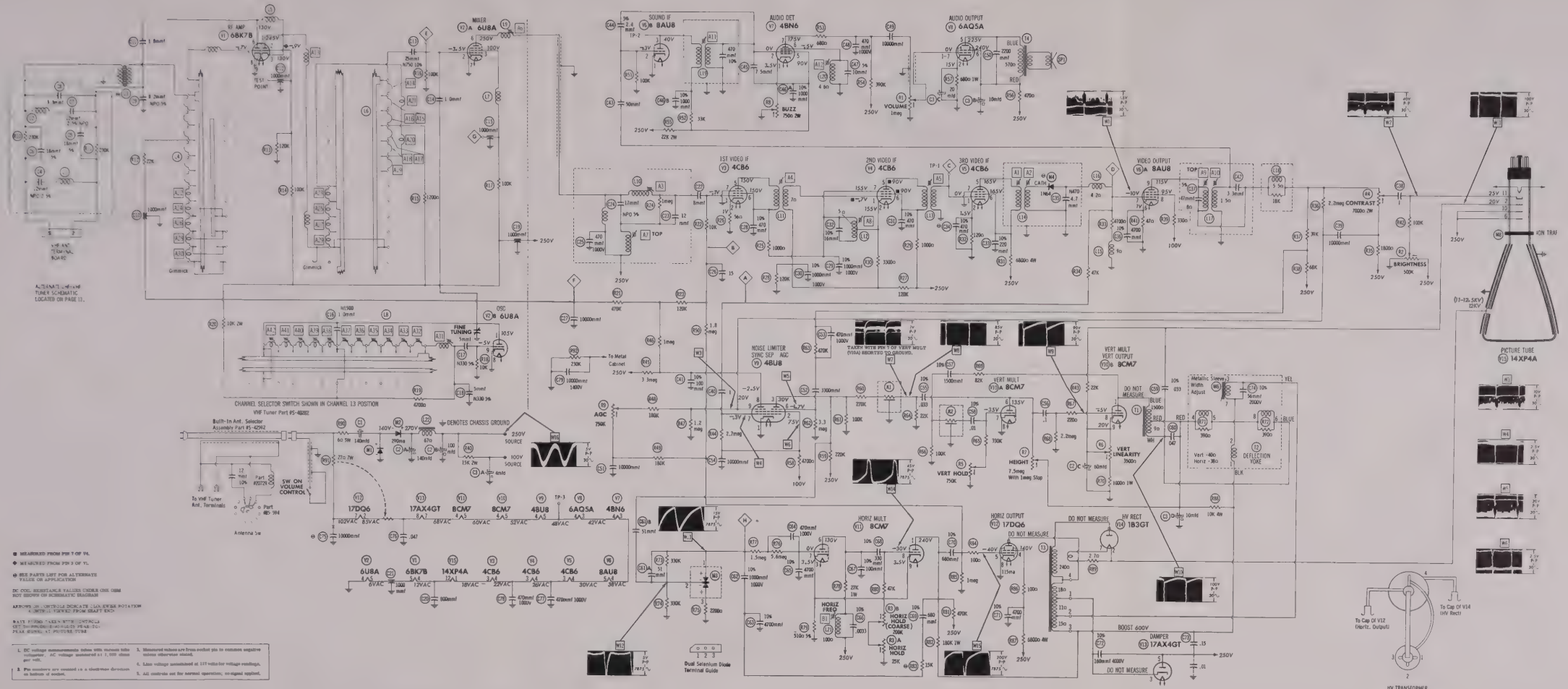
A 6Ω fusible resistor (R90) is used for LV power supply protection. (For location, see tube placement chart).

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America



A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

ZENITH MODELS A1510L, LU, A1511G, GU, A1512J, JU, A1515W, WU (Ch. 15A25, U)

TUBE PLACEMENT CHART

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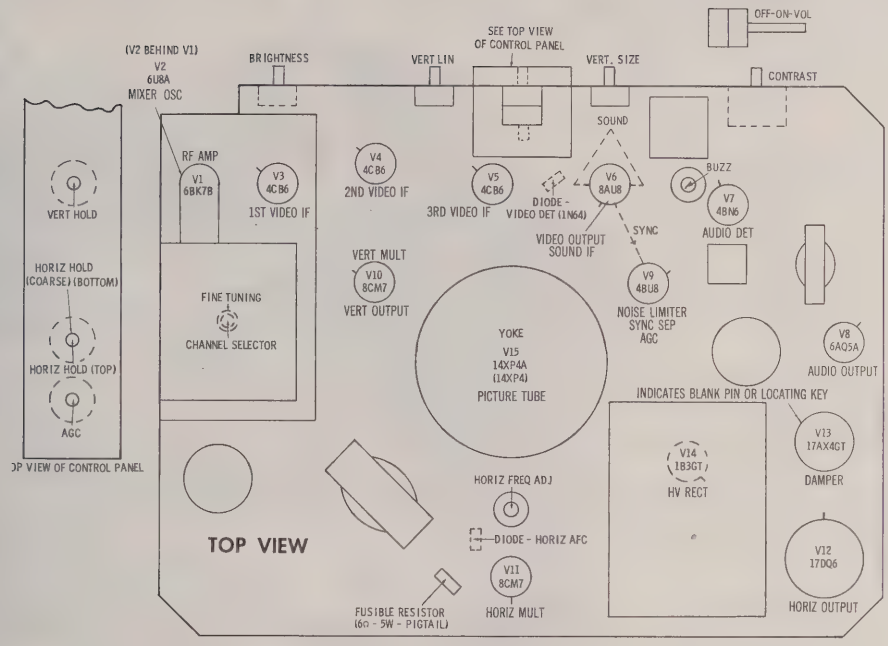


TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

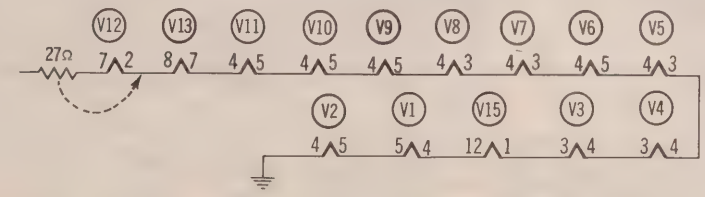
POWER SUPPLY FAILURE
No raster, no sound - **Fusible Resistor (R90), Rectifier (M1, M2)**

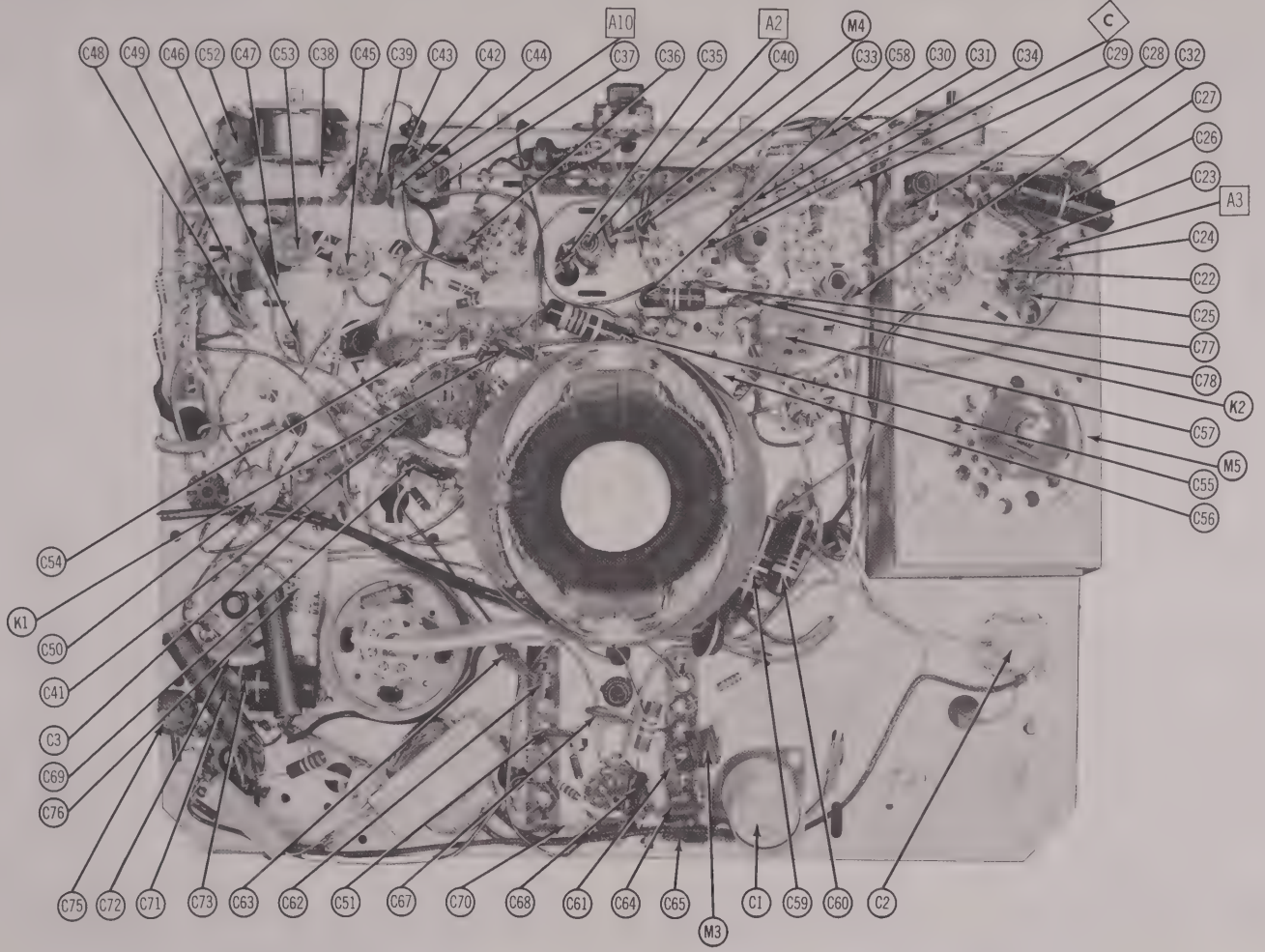
LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - **V3, V4, V5, Diode (M4), V6**
No pic, no sound, has snow - **V1, V2, V3**
No pic, has sound, has raster - **V6, V15**
Has pic, no sound - **V6, V7, V8**
Overloaded picture - **V9**

SYNC FAILURE
No vert. sync - **V9**
No horiz. sync - **V9, Rectifier (M3)**
No vert. or horiz. sync - **V9**

SWEEP FAILURE
No raster, has sound - **M3, V11, V12, V13, V14, V15**
No vertical deflection - **V10**
Poor vert. linearity or foldover - **V10**
Poor horiz. linearity or foldover - **V11, V12, V13**
Narrow picture - **V11, V12, V13, M1, M2**
Vert. off freq. - **V10**
Horiz. off freq. - **V11**

This receiver employs tubes used in a series filament network, an open filament in any tube in the series will cause the set to be inoperative. (See circuit below).





CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.

VIDEO IF ALIGNMENT

Connect a short jumper from point (A) to chassis.
Connect the negative lead of a 6 volt bias supply to point (B). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	470MMF	High side to point (C). Low side to chassis.	43MC (10MC Swp)	41.25MC 45.75MC	Any non-interfering channel	Vert. Amp. thru 10K to point (D). Low side to chassis.	A1, A2	Adjust generator output to maintain 3 volts peak to peak on the scope. Adjust A1 and A2 for a response curve similar to Fig. 1. If proper response cannot be obtained, check to see that the coil slugs are entering their respective windings from the outer end.
2.	"	High side to point (E). Low side to chassis.	"	41.25MC 42.75MC 45.0MC 45.75MC 47.25MC	"	"	A3, A4, A5, A6	Adjust generator output to maintain 3 volts peak to peak on the scope. Adjust for response curve similar to Fig. 2. A3 & A6 affect the peak of the curve. A4, the low side and A5, the high side.
3.	"	"	"	41.25MC 47.25MC	"	"	A7	Increase scope gain 10 times. Adjust A7 for MINIMUM with 41.25MC marker at 50% as in Fig. 3.
4.	"	"	"	40.5MC 41.25MC 42.75MC 45.0MC 45.75MC	"	"	A8	Reduce scope gain to that used in steps 1 and 2. Remove bias from point (B) and connect a jumper to ground. Adjust generator output for a 3 volt peak to peak indication. Adjust A8 for maximum amplitude of 40.5MC marker, but not to exceed 41.25MC marker, similar to Fig. 4. Restore set to normal.

SOUND IF ALIGNMENT

Connect an attenuator (Zenith part #S-17203 or equivalent) in series with the receiver antenna. Tune in a station below the limiting action of the 4BN6 as evidenced by a hiss similar to super-regeneration. Adjust A9, A10, A11 and A12 for maximum sound and best quality. Adjust the buzz control (R8) for MINIMUM buzz. If the hiss disappears during the alignment, increase the attenuator until it reappears.

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 2 volt bias supply to point (F). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	Fig. 5	Across antenna terminals thru matching network (Fig. 5).	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point (G). Low side to chassis.	A13	Adjust by expanding or compressing coil turns for maximum amplitude and symmetry as in Fig. 6.
6.	"	"	207MC (10MC Swp)	205.25MC 209.75MC	12	"	A14	"
7.	"	"	201MC (10MC Swp)	199.25MC 203.75MC	11	"	A15	"
8.	"	"	195MC (10MC Swp)	193.25MC 197.75MC	10	"	A16	"
9.	"	"	189MC (10MC Swp)	187.25MC 191.75MC	9	"	A17	"
10.	"	"	183MC (10MC Swp)	181.25MC 185.75MC	8	"	A18	"
11.	"	"	177MC (10MC Swp)	175.25MC 179.75MC	7	"	A19	"
12.	"	"	85MC (10MC Swp)	83.25MC 87.75MC	6	"	A20, A21, A22	"
13.	"	"	79MC (10MC Swp)	77.25MC 81.75MC	5	"	A23, A24	"
14.	"	"	69MC (10MC Swp)	67.25MC 71.75MC	4	"	A25, A26	"
15.	"	"	63MC (10MC Swp)	61.25MC 65.75MC	3	"	A27, A28	"
16.	"	"	57MC (10MC Swp)	55.25MC 59.75MC	2	"	A29, A30	"

ALIGNMENT INSTRUCTIONS (cont)

VHF OSCILLATOR ALIGNMENT

Connect bias as under "Video IF Alignment".
Adjust the fine tuning so that the index hole in the fine tuning cam is centered directly below the channel 13 oscillator adjustment.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
17.	Fig. 5	Across antenna terminals thru matching network (Fig. 5).	213MC (10MC Swp)	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point ⊕. Low side to chassis.	A31	Adjust to place sound marker in trap notch as in Fig. 7. Video marker should fall at 50%.
			207MC (10MC Swp)	205.25MC 209.75MC	12		A32	
			201MC (10MC Swp)	199.25MC 203.75MC	11		A33	
			195MC (10MC Swp)	193.25MC 197.75MC	10		A34	
			189MC (10MC Swp)	187.25MC 191.75MC	9		A35	
			183MC (10MC Swp)	181.25MC 185.75MC	8		A36	
			177MC (10MC Swp)	175.25MC 179.75MC	7		A37	
			85MC (10MC Swp)	83.25MC 87.75MC	6		A38	
			79MC (10MC Swp)	77.25MC 81.75MC	5		A39	
			69MC (10MC Swp)	67.25MC 71.75MC	4		A40	
			63MC (10MC Swp)	61.25MC 65.75MC	3		A41	
			57MC (10MC Swp)	55.25MC 59.75MC	2		A42	

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UHF IF ALIGNMENT

Tune in a UHF channel and adjust A43 for the best picture and least noise.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

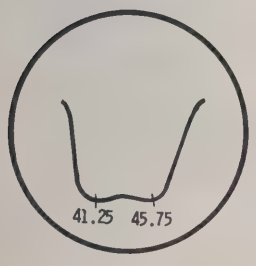


FIG. 1

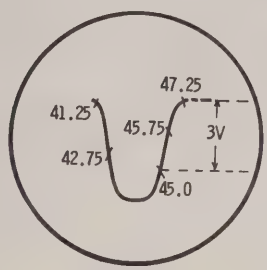


FIG. 2

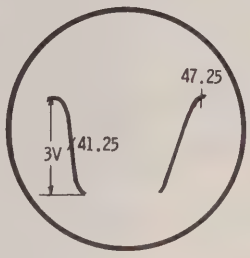


FIG. 3

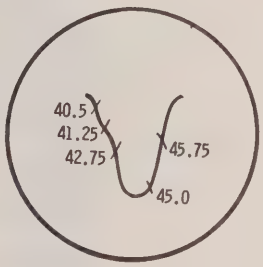
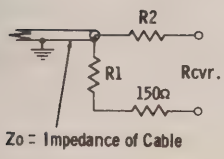


FIG. 4



Zo	R1	R2
50Ω	56Ω	120Ω
75Ω	82Ω	110Ω

FIG. 5

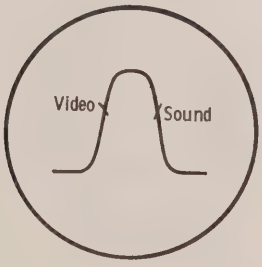


FIG. 6

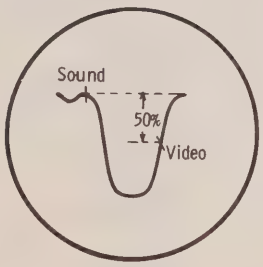


FIG. 7

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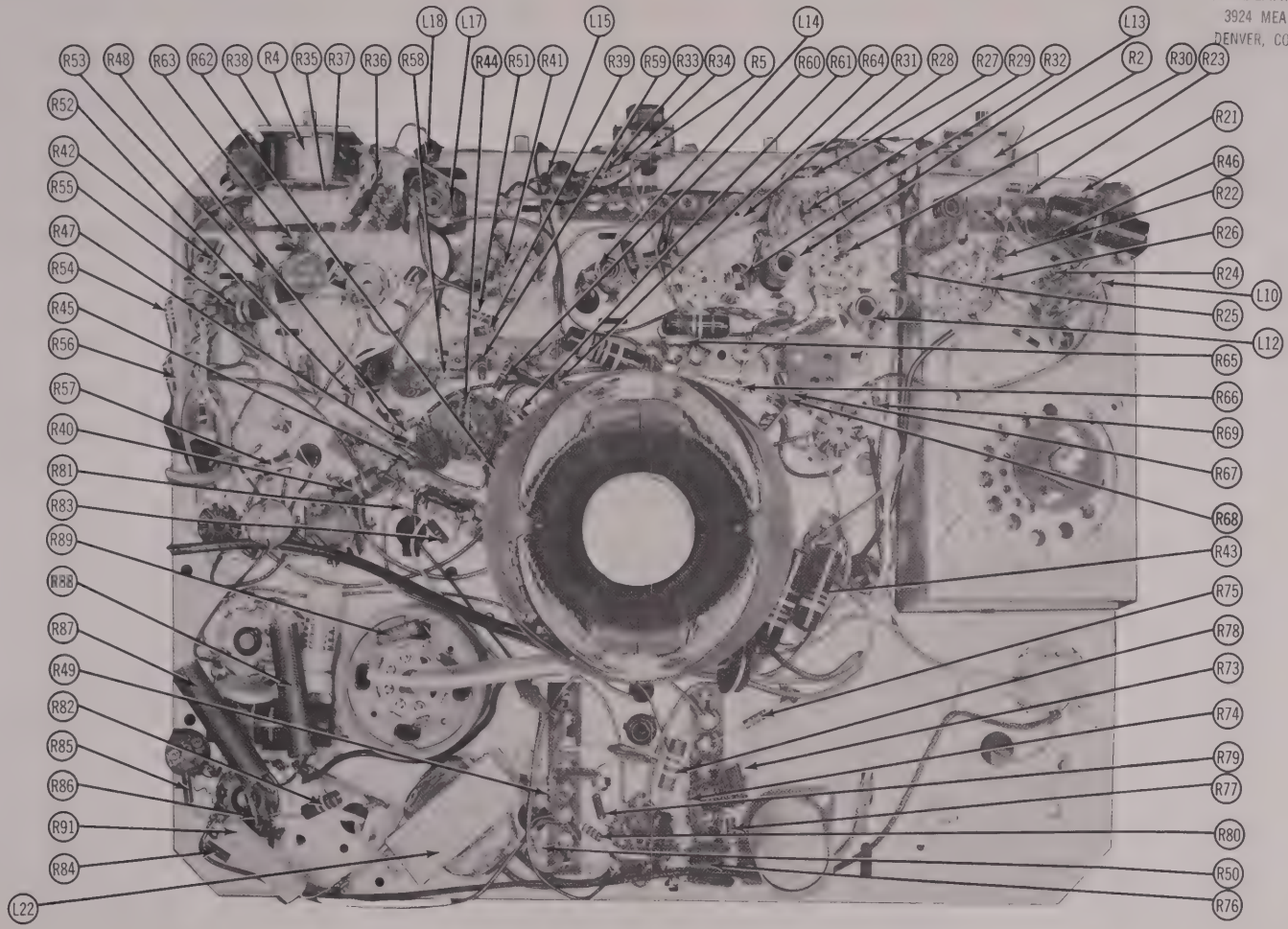
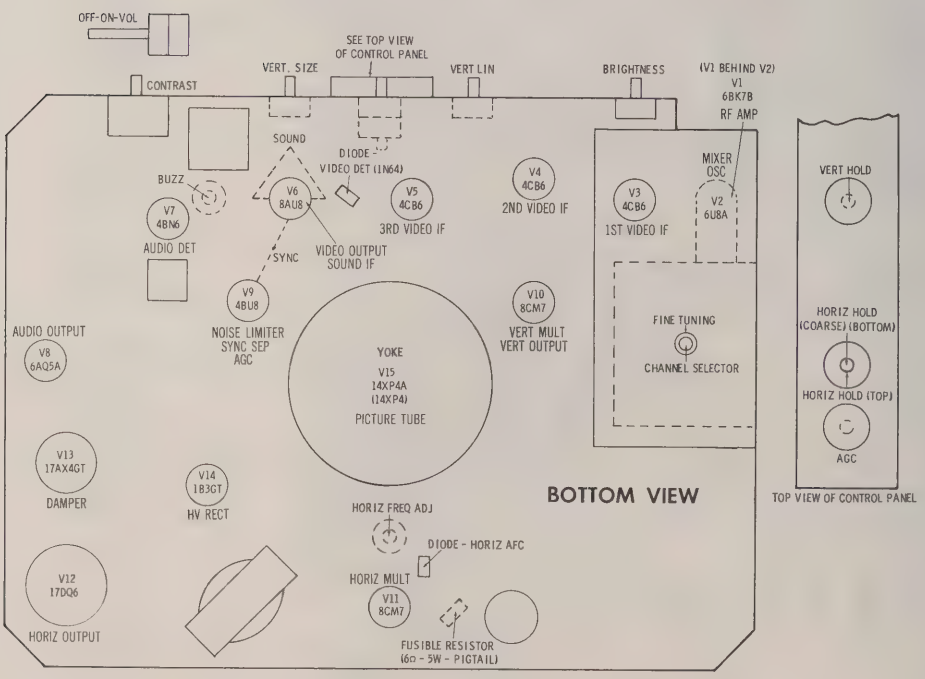


CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BK7A	†1200Ω	60K	INF	3Ω	1.5Ω	INF	2.3meg	0Ω	0Ω
V2	6U8A	†15K	100K	†100K	0Ω	1.5Ω	†4Ω	0Ω	0Ω	10K
V3	4CB6	1.4meg	56Ω	4.5Ω	6Ω	▪1000Ω	▪1000Ω	0Ω		
V4	4CB6	▪3300Ω	▪.6Ω	6Ω	7.5Ω	†1000Ω	†1000Ω	60K		
V5	4CB6	.1Ω	120Ω	7.5Ω	9Ω	†6800Ω	†6800Ω	0Ω		
V6	8AU8	0Ω	100K	†55K	11Ω	9Ω	47Ω	4700Ω	†15K	†8800Ω
V7	4BN6	•425Ω	.1Ω	11Ω	12Ω	†22K	4.6Ω	†390K		
V8	6AQ5	0Ω	680Ω	12Ω	13.5Ω	†1040Ω	†470Ω	0Ω		
V9	4BU8	0Ω	†20K	55K	14.5Ω	13.5Ω	3.3meg	2.7meg	1.6meg	450K
V10	8CM7	‡11K	NC	0Ω	16.5Ω	14.5Ω	•‡4.5meg	•650K	2.2meg	•1350Ω
V11	8CM7	‡140K	NC	510Ω	18.5Ω	16.5Ω	†27K	7.6meg	•150K	510Ω
V12	17DQ6	TP	23Ω	TP	†6900Ω	500K	TP	26Ω	0Ω	TOP CAP ‡18Ω
V13	17AX4GT	TP	NC	¶	NC	†0Ω	NC	18.5Ω	23Ω	
V14	1B3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡258Ω
V15	14XP4A	4.5Ω	•23K	PIN 6 †0Ω	PIN 10 †0Ω	PIN 11 •130K	PIN 12 3Ω			

¶ THIS READING CAN VARY GREATLY, (10K MINIMUM), DUE TO THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 250V SOURCE.
‡ MEASURED FROM PIN 3 OF V13.
▪ MEASURED FROM PIN 7 OF V4.
TP TIE POINT
NC NO CONNECTION.



TUBE PLACEMENT CHART

ZENITH MODELS A1510L, LU, A1511G, GU,
A1512J, JU, A1515W, WU (Ch. 15A25, U)
ALTERNATE TUNER SCHEMATIC
FOLDER 4
MIXER A 6U8A
RF AMP 6BK7A
OSC B 6U8A
6BK7A
6U8A
UHF OSC 3AF4A
CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION
FINE TUNING
VHF ANT. TERMINALS
UHF ANT. TERMINALS
VHF Tuner Part #S-40283
UHF Tuner Part #S-41361
Crystal Mixer
Channel Bracket
Distributed Capacitance
Note: Core Serves As RF Choke To Prevent Oscillator Radiation And Must Not Be Removed
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	RF Amplifier	6U8/7S	
V2	Mixer-Osc	6U8A	
V3	1st Video IF Amp	4CH6	
V4	2nd Video IF Amp	4CH6	
V5	3rd Video IF Amp	4CH6	
V6	Video Output-Sound IF Amp	6AL9	
V7	Audio Det	6BN6	
V8	Audio Output	6AQ5A	

ITEM No	USE	TYPE	NOTES
V9	Noise Limiter-Sync Sep. - AGC	4BU8	
V10	Vert Mult -Vert. Output	8CM7	
V11	Horiz Mult	8CM7	
V12	Horiz Output	17DQ6	
V13	Damper	17AX4GT	
V14	HV Rectifier	1B3GT	

PICTURE TUBE

ITEM No	REPLACEMENT DATA			NOTES
	ZENITH PART No	GENERAL ELECTRIC PART No	SYLVANIA PART No	
V15	14XP4A 14XP4		14XP4A [Silver screen "85" 14XP4	

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						NOTES
	CAP	VOLT	ZENITH PART No	AEROVOX PART No	CORNELL-DUBILIER PART No	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No
C1	140	150	23-3765	AFH31-23	XA028G	FP317	TMS-34	D-088	TVL-1438
C1A	140	300	23-3741	AFH3-99-83	CO734.3	FP336.7	TMT-175 [T-US	TM-1-4500	R3500 *
B	80	300					UTD-150-300	MTD-4540	
C	180	50							
C1A	40	300	23-3744	AFH4-114-55	D0784.8	FP486			R3538 *
B	80	300							
C	30	35							
D	140	500							

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	ZENITH PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C4	13		23-3679							NPO 2.5%
C5	18	1000	23-2680							5%
C6	18	1000	23-2680							5%
C7	13		23-3678							NPO 2.5%
C9	3.3		23-3243	NPO-SI 3.3	TCZ-3R3	C10Y33C	TCO-3.3	ET-5533		YTCCB-Y33
C10	3.3		23-3242	NPO-SI 3.3		C10Y33C	TCO-3.3			NPO 5%
C10	1000		23-3889	EF-001	MFT-1000				503C-DI	
C11	1.8		23-3238							
C12	1000		23-3888	EF-001	MFT-1000				503C-DI	
C13	35		23-3671	NT50-SI 35	TCN-35	C10Q35U	TCT-35		YTCU-Q35	N750 10%
C14	1.0		23-3730	NPO-SI 1.0	TCZ-1		TCO-1		YTCCB-Y1	
C15	1000		23-3889	EF-001	MFT-1000				503C-DI	
C16	1.0		23-3714							N1500
C17	8		23-3716							N330 5%
C18	5		23-3716							N330 5%
C19	1000		23-3889	EF-001	MFT-1000				503C-DI	
C20	800		23-3231	BPD-0008	DD-801	L10T8	ED-0008		SGA-T8	
C21	1000		23-3889	EF-001	MFT-1000				503C-DI	
C22	8		23-3681			C10Y8C				
C23	.13		23-2948							
C24	17		23-3594							NPO 5%
C25	470	1000	23-2	HVD-15-470	DD-471	BYA107-47	HD15-470	DC03047	SGA-T47	
C26	15	300	23-3147	P288N-15		CUB2P15		GEM-3015	XTM-P15	
C27	10000		23-3	BPD-01	DD-103	BYA881	ED-01	DC511	36K-S1	
C28	470		23-16		D6-471	5RS747	ED-470		MS-347	10%
C29	1000	1000	23-17							10%
C30	1000	1000	23-17							10%
C31	470		23-16		D6-471	5RS747	ED-470		MS-347	10%
C32	18		23-2296	NPO-SI 15	TCZ-15	C7A6Q15C	ED-15		YTCC-Q15	10%
C33	220		23-2926	1469-00022	D6-221	22RS722	ED-220		MS-322	10%
C34	470		23-16		D6-471	5RS747	ED-470		MS-347	10% ①
C35	4.7		23-2742							N470
C36	4700		22-14			1RSD47	CY30C473K		MS-347	10%
C37	47		23-2467		TCZ-47	22RS047	TCO-47		MS-447	5%
C38	.1	200	23-1777	P288N-1		CUB4P1		GEM-201	XTM-P1	
C39	10000		23-3	BPD-01	DD-103	BYA881	ED-01	DC511	36K-S1	
C40	.1	200	23-1777	P288N-1		CUB4P1		GEM-201	XTM-P1	
C41	100		23-9	NPO-DI 100	DD-101	L10T1	ED-100	ZT-531	MS-31	10%
C42	3.3		23-2243	NPO-SI 3.3	TCZ-3R3	C10Y33C	TCO-3.3	ET-5533	YTCCB-Y33	
C43	30		23-2460	NPO-SI 30	TCZ-30	L7T6Q6	OP-50		SGA-Q6	
C44	2.4		23-2296							
C45	2.4		23-2742							
C46A	1000		22-21			1RSD1	ED-1000	MCB255	MS-31	10%
B	1000					1RSD1	ED-1000	MCB255	MS-31	10%
C47	10		23-2731	NPO-DI 10	TCZ-10	22RS3Q	TCO-10	ET-541	MS-41	5%
C48	470	1000	22-5	HVD-15-470	DD-471	BYA107-47	HD15-470	DC03047	SGA-T47	
C49	10000		23-3	BPD-01	DD-103	BYA881	ED-01	DC511	36K-S1	
C50	2200		23-8	BPD-0022	DD-222	BYA10D22	ED-0022	UC-5222	SGA-D22	
C51	10000		23-3	BPD-01	DD-103	BYA881	ED-01	DC511	36K-S1	
C52	3300		23-11	BPD-0033	DD-332	BYA10D33	ED-0033	UC-5233	SGA-D33	
C53	470	1000	22-5	HVD-15-470	DD-471	BYA107-47	HD15-470	DC03047	SGA-T47	
C54	10000		23-3	BPD-01	DD-103	BYA881	ED-01	DC511	36K-S1	
C55	033	400	22-2635							10%
C56	.1	400	22-2061	P488N-1	DF-104	CUB4P1		GEM-401	XTM-P1	
C57	1500		22-2536	1464-0025		1RSD25	ED-1500		MS-215	10%
C58	01	200	22-2565							10%
C59	033	600	22-2325							10%
C60	047	200	22-1778	P288N-047	DF-503	CUB3S47		GEM-4147	XTM-S47	
C61A	51		22-25	SI 51	DD-500	L10Q51	ED-51	UC-545	SGA-Q5	
B	51			SI 51	DD-500	L10Q51	ED-51	UC-545	SGA-Q5	
C62	1000	1000	22-17							10%
C63	4700		22-14			1RSD47	CY30C472K		MS-347	10%
C64	470	1000	22-5	HVD-15-470	DD-471	BYA107-47	HD15-470	DC03047	SGA-T47	
C65	4700		22-14			1RSD47	CY30C472K		MS-347	10%
C66	0033	200	22-2564					GEM-16333		10%
C67	100		22-9	NPO-DI 100	DD-101	22RS71	ED-100	MCB235	MS-31	10%
C68	330		22-2666	1469-00083	D6-331	5RS723	ED-330		MS-333	10%
C69	680		22-2668	1464-00068	D6-681	1RS768	ED-680		MS-368	10%
C70	680		22-2939		D6-681	1RS768	ED-680		MS-368	10%
C71	4700		22-14			1RSD47	CY30C472K		MS-347	10%
C72	160	4000	22-2683							10%
C73	15	400	22-2261	P488N-15		CUB4P15		GEM-4015	XTM-P15	

ITEM No	RATING		REPLACEMENT DATA						NOTES
	CAP	VOLT	ZENITH PART No	AEROVOX PART No	CENTRALAB PART No	CORNELL-DUBILIER PART No	ERIE PART No	MALLORY PART No	SPRAGUE PART No
C74	56	2000							10%
C75	10000		23-3	BPD-01	DD-103	BYA881	ED-01	DC511	36K-S1
C76	047	600	22-1544	P488N-047	DF-503	CUB3S47		GEM-6147	XTM-S47
C77	470	1000	22-5	HVD-15-470	DD-471	BYA107-47	HD15-470	DC03047	SGA-T47
C78	470	1000	22-5	HVD-15-470	DD-471	BYA107-47	HD15-470	DC03047	SGA-T47
C79	10000	1600	22-2655		DAC-27	HVE1681		GEM-1681	B1-S10

1. Some versions may use 1000mmf disc 10% 1000V (Part #23-17) in this application
2. Not used in some versions.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	ZENITH PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	63-3096	B-89	A47-1meg-6	QH-137	U54	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			K3-1	SWE-15	76-1	U8-26	
R2A	500K	½	63-3264	AB-65		QT-533	PTA55R	Brightness
B	Shaft			AK-19		TQ	Not Req.	
R3A	25K	½	63-3273					Horiz. Hold
B	300K							Horiz. Hold (Coarse)
R4A	7000Ω	2(WW)	63-3290	WN-752	A43-7500		R7500L	Contrast
B	Shaft			Not Req.	KB5-3		Not Req.	
R5A	750K	½	63-3263	AB-66	A47-750K-S	QH-136	PTA754L	Vert. Lin.
B	Shaft			AK-19	RN-3	TQ	Not Req.	
R6A	3500Ω	½	63-3265	AB-9	A47-4000-S	QH-14	PTA353L	Vert. Lin.
B	Shaft			AK-19	RN-3	TQ	Not Req.	
R7A	7.5meg	½	63-3263	AB-88 *	A47-7.5meg -S*	QH-142 *	PTA885L *	Height with lmeg stop
B	Shaft			AK-19	RN-3	TQ	Not Req.	
R8	750Ω	2(WW)	63-3264		35-800		FL-750	Buzz
R9A	750K	½	63-3263	AB-66	A47-750K-S	QH-136	PTA754L	AGC
B	Shaft			AK-19	RN-3	TQ	Not Req.	

* Use a lmeg resistor in series with the right hand terminal.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		ZENITH PART No.	NOTES
	OHMS	WATT		
R10	230K			
R11	230K			
R12	22K			
R13	120K			
R14	100K			
R15	1800Ω			
R16	100K			
R17	100K			
R18	10K			
R19	4700Ω			
R20	10K	2		
R21	470K		63-1698	
R22	10K			
R23	150K		63-1673	
R24	1meg		63-3093	
R25	1000Ω		63-1786	
R26	58Ω		63-1723	
R27	150K		63-1673	
R28	120K		63-1673	
R29	1000Ω		63-1786	
R30	3300Ω		63-1807	
R31	6800Ω	4	63-3976	
R32	1.25Ω		63-1747	
R33	4700Ω		63-1813	
R34	47K		63-1655	
R35	1800Ω		63-1796	
R36	2.2meg		63-1925	
R37	39K		63-1652	
R38	68K		63-1663	
R39	330Ω		63-1785	
R40	15K	2	63-943	
R41	47Ω		63-1729	
R42	100K		63-1670	
R43	22K		63-1641	
R44	2.7meg		63-1929	
R45	3.3meg		63-1931	
R46	1meg		63-1681	
R47	1.2meg		63-1815	
R48	180K		63-1680	
R49	180K		63-1680	
R50	1.5meg		63-1922	
R51	100K		63-1670	

ITEM No.	RATING		ZENITH PART No.	NOTES
	OHMS	WATT		
R52	33K		63-1649	
R53	680Ω		63-1779	
R54	390K		63-1694	
R55	22K	2	63-1568	
R56	470Ω		63-1717	
R57	680Ω	1	63-2290	
R58	4700Ω		63-1814	
R59	220K		63-1683	
R60	270K		63-1687	
R61	100K		63-1889	
R62	3.3meg		63-1932	
R63	470K		63-1898	
R64	22K		63-1641	
R65	330K		63-1890	
R66	100K		63-1669	
R67	220Ω		63-1758	
R68	2.2meg		63-1930	
R69	82K		63-1665	
R70	1000Ω	1	63-965	
R71	390Ω			
R72	390Ω			
R73	330K		63-1890	
R74	330K		63-1890	
R75	2200Ω		63-1790	
R76	5.6meg		63-1943	
R77	1.5meg		63-1918	
R78	27K	1	63-1192	
R79	510Ω 5%		63-1713	
R80	47K		63-1655	
R81	470K		63-1898	
R82	180K	1	63-2313	
R83	15K		63-1634	Note 1
R84	100Ω		63-1744	
R85	1meg		63-1913	
R86	100Ω		63-1744	
R87	8800Ω	4	63-3976	
R88	10K	4	63-3823	
R89	2.7Ω		63-2631	
R90	6Ω	5	63-3844	
R91	27Ω	7	63-3972	
R92	220K			

Note 1. Some versions may use a 12K in this application.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		ZENITH PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thorderson PART No.	Triad PART No.
T1	Vert. Output	96-1525	Z1307 ①	A-2824 ①	V315 ①	VO-10 ②	26S78 ①	A-115X
T2A	Yoke-Horiz. (23.5MH) (90°)-Vert. (38MH)	95-1527 ③	DF508 ④	MDT-81 ⑤	YR0F12/47 ⑥	DY-13A ⑦	Y-14 ⑧	Y-40 & NW41
B								
M7	Rear Cover & Centering Device	8-23237						YC1
T3	Horiz. Output	8-41974						

① Cut and tape blanking lead.
② Drill new mounting hole(s).
③ Includes resistors (R71, R72) and capacitor (C74).
④ Use original yoke damping network. If necessary, original rear cover and centering device. Cut and form a piece of .010 gauge flat paper inside the yoke itself and support with an acetate cement, to provide an insulation between the width sleeve and the yoke proper.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ZENITH PART No	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thorderson PART No.	Triad PART No	
T4	9700Ω	3-4Ω	95-1534	Z1117 [	A-2932 ①	A-3879 ①	24S83	S-11X	① Drill new mounting hole.

SPEAKER

ITEM No.	TYPE				REPLACEMENT DATA		NOTES
	SIZE	FIELD	V C	IMP	ZENITH PART No	QUAM PART No.	
SP1	4"	PM		3-4Ω	49-814	4A07	

COILS (RF-IF)

ITEM No.	USE	ZENITH PART No.	NOTES
L1	IF Trap Coil	20-567	
L2	IF Trap Coil	20-567	
L3	Ant. Trans.	S-24564	Note 1
L4	Ant. Coils	S-23643	Channel 2-13, Wafer Assy.
L5	Neut. Coil	20-633	

ITEM No.	USE	ZENITH PART No.	NOTES
L6	RF Coils	S-23640	Channel 2-13, Wafer Assy.
L7	Mixer Screen Coil	20-633	
L8	Osc. Coils	S-23639	Channel 2-13, Wafer Assy.
L9	Mixer Plate Coil	S-24377	

ITEM No.	USE	REPLACEMENT DATA					NOTES
		ZENITH PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L10	1st. Video IF	S-41977					Includes 47.25MC Trap and Assy.
L11	2nd. Video IF	S-40279					
L12	40.5MC Trap	S-24080					
L13	3rd. Video IF	S-40280					
L14	4th. Video IF	S-42264					
L15	Shunt Peaking Coil	S-19015	19-3300	TV-190	6132	VP-7	225 Microhenries 25 Microhenries
L16	Resonant Choke	S-22444					
L17	4.5MC Trap	S-40818					
B	1st. Sound IF						
L18	Series Peaking Coil	S-20880	19-3135 *		6153 *		137 Microhenries, wound on 15K resistor
L19	2nd. Sound IF	S-40276					
L20	Quadrature Coil	S-19020	20-1005 a	TV-131	1480 a		a Drill new mounting hole.

* Parallel with 15K resistor.
Note 1. Alternate part #S-24845 may be used in some versions.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	ZENITH PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thorderson PART No	
L21	100Ω		S-23352	19-1576	TV-163	6210	H-102	HS-5	20-40 Millihenries

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D.C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ~/s)	ZENITH PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thorderson PART No	Triad PART No.
L22	290A	67Ω	1.3 Hy.	95-1543	C9037 ①	C-2296 ①	C-2338 ①	26C44 ①	C-27X

① Drill new mounting hole.

COMPONENT COMBINATIONS

ITEM No	USE	DESCRIPTION	ZENITH PART No	REPLACEMENT DATA
K1	Vert Integrator		87-5	
K2	Vert Feedback		87-4	

RECTIFIERS

ITEM No	RATING		REPLACEMENT DATA				NOTES
	CURRENT (Measured)	ZENITH PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.240A	212-14 [	1236A ①	1N1007 ②	MR300 ①	300 ① M300 ②	① Selenium type. ② Germanium type.
M2	.340A	212-16 ①	1236A ①	1N1007 ②	MR300 ①	300 ① M500 ②	③ Silicon type. ④ 2 Required.
M3		103-20 ①	1215 ① ④		YT1 ① ④		

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		ZENITH PART No.	CBS PART No.	SYLVANIA PART No.	
M4	1N64	103-18 *	1N64	1N64	Video Detector (Pigtail)

* Part #103-21 may be used in some versions.

MISCELLANEOUS

ITEM No	PART NAME	ZENITH PART No.	NOTES
M5	Tuner	S-40283	VHF - Ch. 15A35
	Tuner	S-40283	VHF - Ch. 15A35U
	Tuner	S-41361	UHF - Ch. 15A35U
M6	Width Sleeve		
M7	Centering Device	S-23237	Includes yoke cover
M8	Ion Trap		

ZENITH MODELS A15I0L, LU, A15I1G, GU, A15I2J, JU, A15I5W, WU (Ch. 15A35, U)

FOLDER 4

PARTS LIST AND DESCRIPTIONS (Continued)

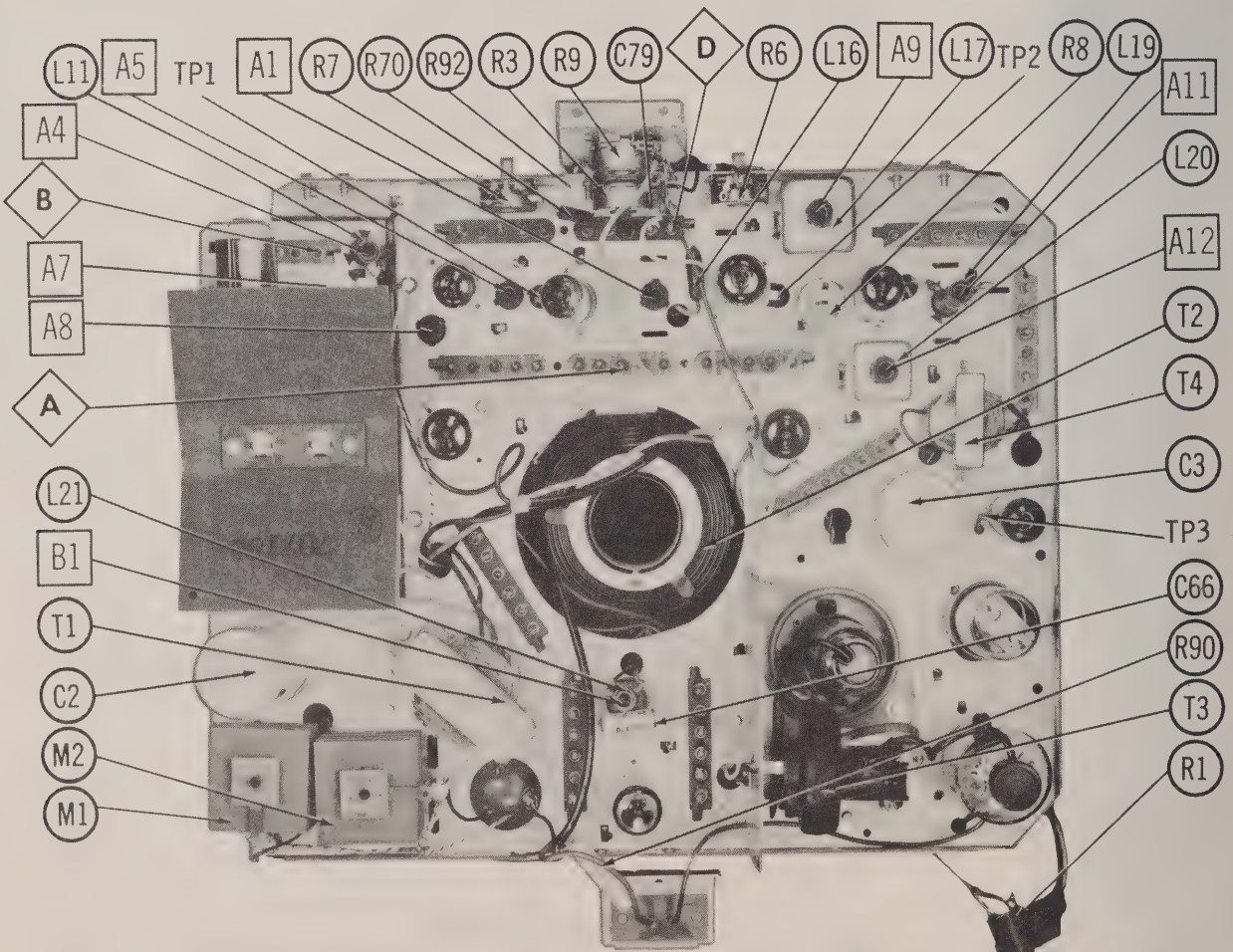
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Safety Glass	192-235	Models A1512J,JU, A1511G, GU, A1515W, WU
Safety Glass	192-234	Models A1510L, LU
Escutcheon	57-2408	Models A1512J, JU
Escutcheon	57-2406	Models A1510L, LU
Escutcheon	57-2407	Models A1511G, GU
Escutcheon	57-2409	Models A1515W, WU
Knob	46-1650	Channel Selector - Models A1512J, JU
Knob	46-1651	Channel Selector - Models A1510L, LU
Knob	46-1839	Channel Selector - Models A1511G, GU
Knob	46-1869	Channel Selector - Models A1515W, WU
Knob	S-40431	Fine Tuning
Knob	S-40558	UHF Dial
Knob	46-1646	On-off-volume - Models A1512J, JU
Knob	46-1647	On-off-volume - Models A1510L, LU
Knob	46-1838	On-off-volume - Models A1511G, GU
Knob	46-1868	On-off-volume - Models A1515W, WU
Knob	S-42671	Contrast
Knob	46-1849	Horiz. Hold, Vert. Hold, Brightness
Cabinet	14-2261	Models A1512J, JU
Cabinet	14-2259	Models A1510L, LU
Cabinet	14-2260	Models A1511G, GU
Cabinet	14-2262	Models A1515W, WU

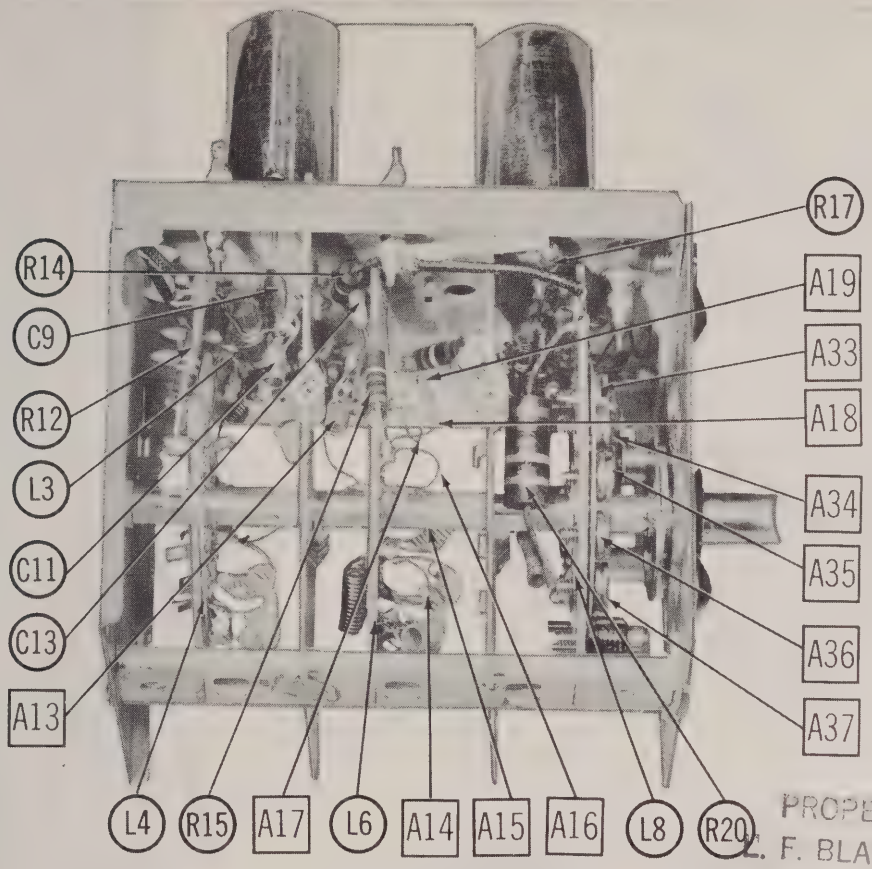
WIRING DATA

High Voltage Lead	Use BELDEN No.	8869
Shielded Hook-up Wire	Use BELDEN No.	8885 (Single Conductor)
		8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No.	8530 (Solid) Available in Ten Colors
		8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No.	8874
300Ω Tuner Input Lead	Use BELDEN No.	8225
300Ω Antenna Lead-in	Use BELDEN No.	8230 or 8275
Antenna Rotor Cable	Use BELDEN No.	8464 (Flat) or 8484 (Round) - 4 Conductor
		8485 (Round) - 5 Conductor
		8488 (Round) - 8 Conductor



TP1	0V	3RD VIDEO IF GRID
TP2	41V	SOUND IF PLATE
TP3	48VAC	FIL

CHASSIS TOP VIEW



RF TUNER-LEFT SIDE

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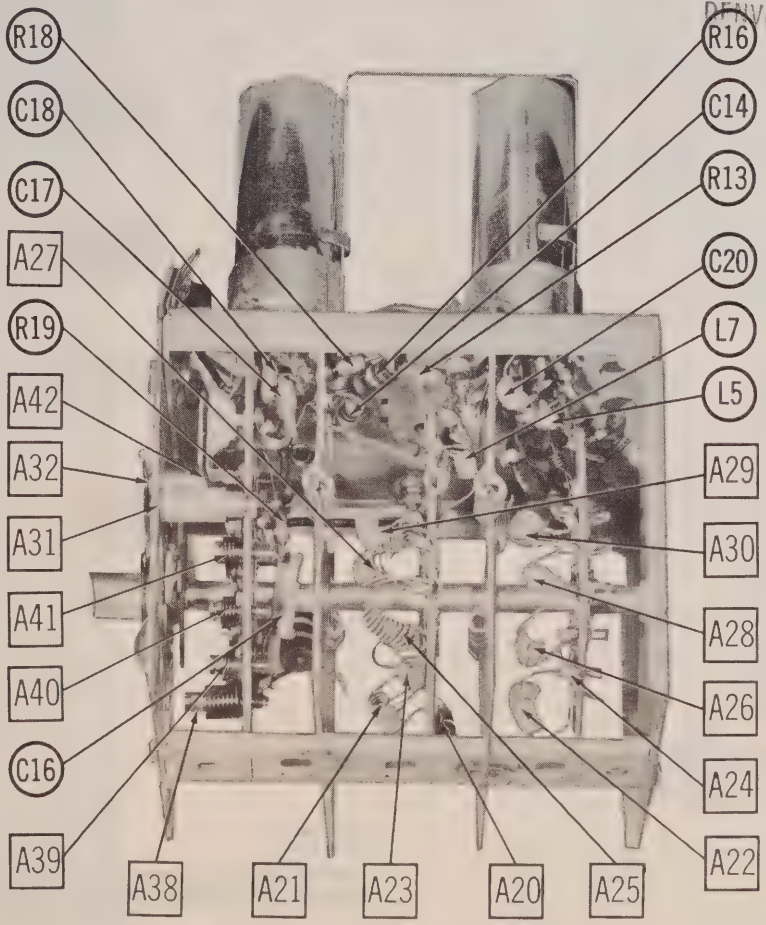
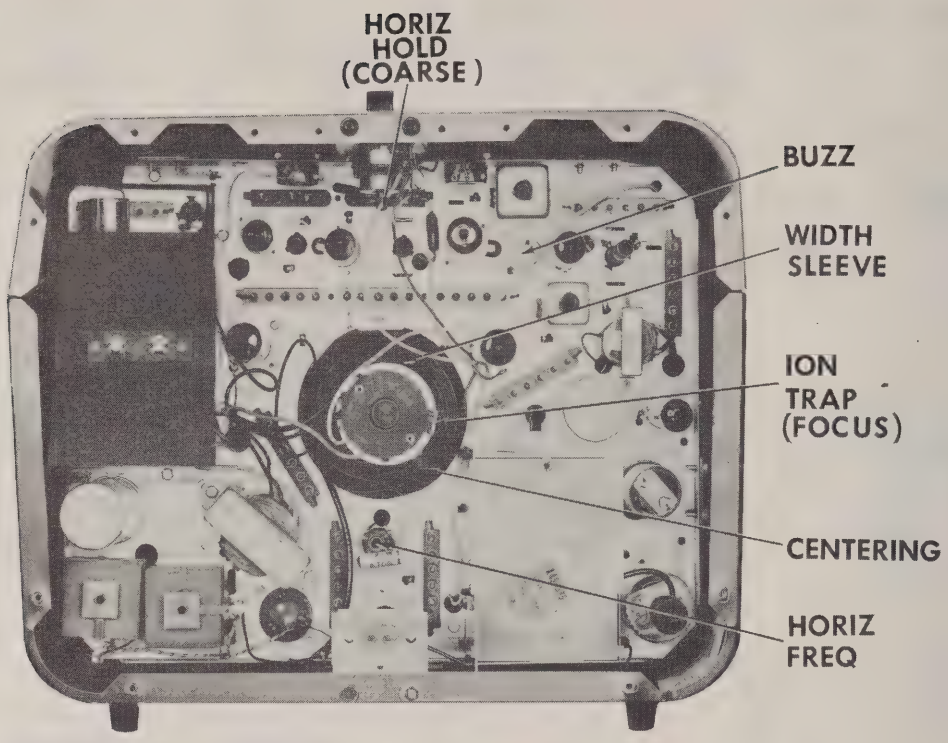


RF TUNER-RIGHT SIDE



CABINET—REAR VIEW

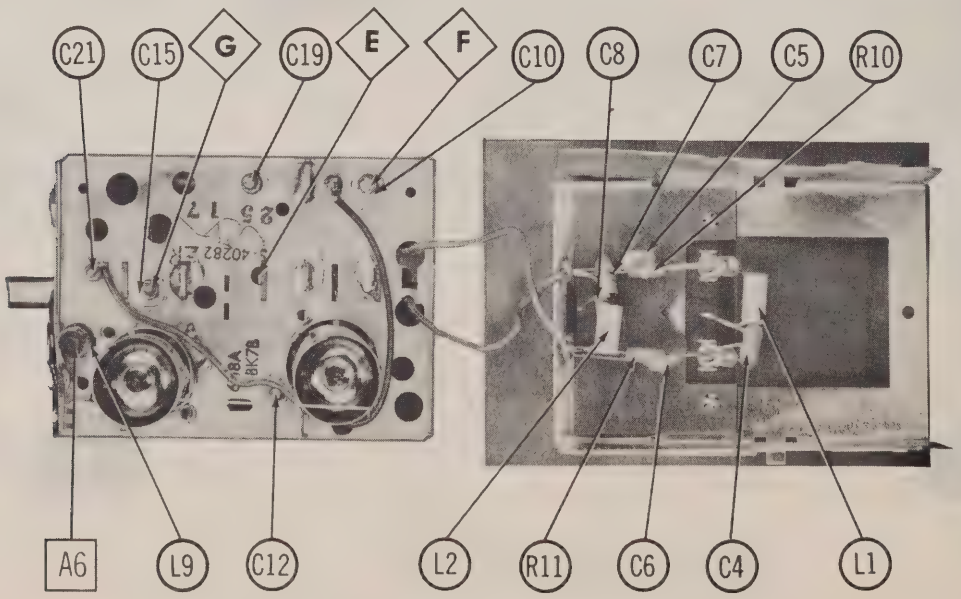
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Connect a clip lead from point Ⓗ to chassis. Connect another short clip lead across the horizontal frequency coil (L21). Set the horizontal hold control to the center of its range.

Tune in a TV station and adjust the horizontal hold (coarse) until the picture is as nearly in sync as possible.

Remove the clip lead from L2 and adjust the horizontal frequency slug (B1) until the picture is as nearly synchronized as possible.

Remove the clip lead from point Ⓗ to chassis. If necessary to insure positive synchronization, retouch the coarse horizontal hold control.



RF TUNER—TOP VIEW

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 9 IN SET 342

MAGNAVOX CHASSIS CR-729CA

Magnavox Chassis CR-729AA and CR-729BA were covered in Photofact Folder 9 — Set 342.

Chassis CR-729CA is electrically identical to the chassis covered, except for the following changes.

COMPONENT CHANGES

R1 (Volume Control & Switch) is changed to part #220662-1.

X1 (Converter) is changed from 2N172 to 2N253.

X2 (1st IF Amp.) is changed from 2N145 to 2N253.

X3 (2nd. IF Amp.) is changed from 2N147 to 2N254.

L1 (Loop Stick) is changed to part #461512-2.

L2 (Osc. Coil) is changed to part #360708-1.

R2 is decreased from 100K to 3300Ω.

R4 is increased from 1500Ω to 2700Ω.

R5 is omitted and replaced by a buss wire.

R17 is decreased from 100Ω to 68Ω.

A 15K ½ watt resistor is added from the base of X6 to the collector of X6.

A 15K ½ watt resistor is added from the base of X5 to the collector of X5.

A 12K ½ watt resistor is added from the junction of R2 and C6 to ground.

R3 is omitted.

C6 is decreased from .05mfd to .01mfd.

C7 is decreased from 10000mmf to 5000mmf.

C10 is omitted.

C15 is increased from 18mmf to 22mmf.

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 16 IN SET 356

STEELMAN MODEL 3D12U

Steelman Model 3D12 was covered in Photofact Folder 16 — Set 356.

Model 3D12U is electrically identical to the model covered, except for the following changes.

COMPONENT CHANGES

C2 is omitted and is replaced with a 27K, ½ watt resistor.

C1C is omitted.

R4 is decreased from 150Ω to 100Ω.

R3 is decreased from 470K to 220K.

R5 is increased from 330Ω to 4700Ω.

C1A is increased from 40mfd to 50mfd.

C1B is decreased from 40mfd to 30mfd.

PRODUCTION CHANGES
BULLETIN 201

PRODUCTION CHANGES
BULLETIN 201

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 18 IN SET 354

Truetone Models 2D3775A and 2D3775B were covered in Photofact Folder 18 — Set 354.

Models 2D3775C, 2D3777A, 2D3814A and 2D3815A are electrically identical to the models covered, except for the following changes.

2D3775C

MODIFICATIONS FOR 50 CYCLE OPERATION

A 20mfd @ 450V electrolytic capacitor is added in parallel with L13 (filter choke).

A 10mfd @ 150V electrolytic capacitor is added from the junction of C71 and R15 to ground.

A 250mfd @ 150V electrolytic capacitor is added from the junction of C69 and 130V source to ground.

2D3777A

UHF/VHF TUNER CHANGED

Model 2D3777A uses UHF/VHF tuner #1D3093. A schematic showing the new tuner is given in Fig. 2.

COMPONENT CHANGE

A .22mfd @ 600V capacitor is added across the AC interlock.

MODIFICATIONS FOR 50 CYCLE OPERATION

A 20mfd @ 450V electrolytic capacitor is added in parallel with L13 (filter choke).

A 10mfd @ 150V electrolytic capacitor is added from the junction of C71 and R15 to ground.

A 250mfd @ 150V electrolytic capacitor is added from the junction of C69 and 130V source to ground.

2D3814A, 2D3815A

VHF TUNER CHANGED

Models 2D3814A and 2D3815A use VHF tuner #201E055. A schematic of the new tuner is given in Fig. 1.

V13 (picture tube) may be a 14RP4 or a 14RP4A.

A .22mfd @ 600V capacitor is added across the AC interlock.

The wattage rating of R67 is increased from 10 watts to 20 watts.

R58 may be 56K, 68K or 75K.

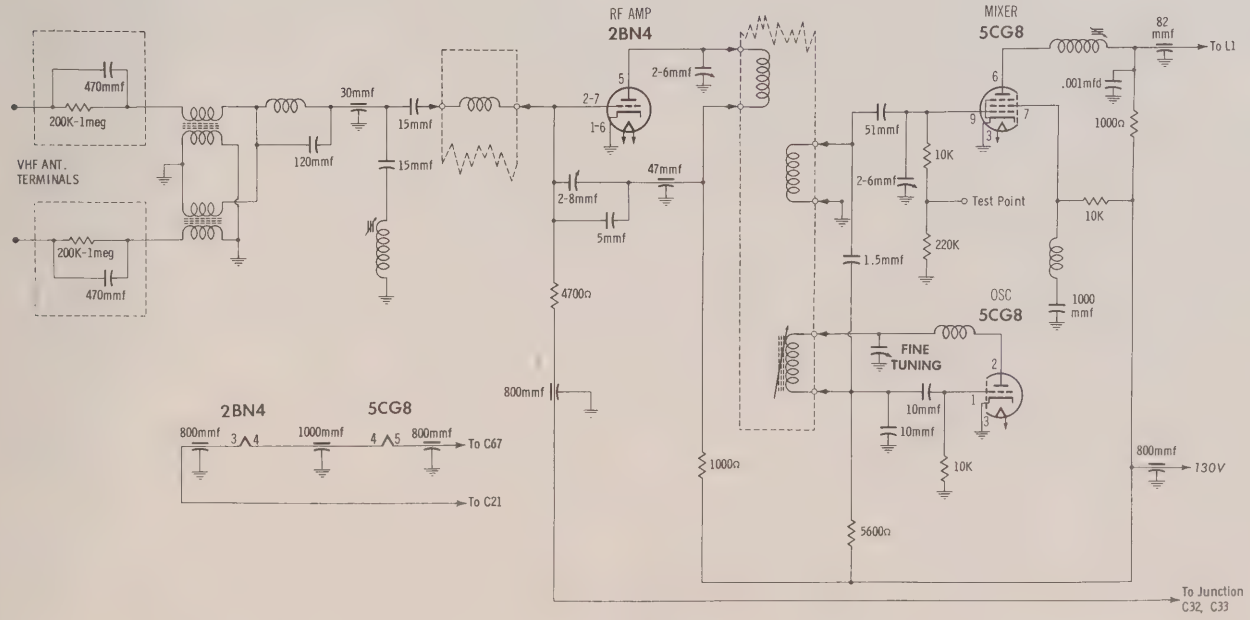
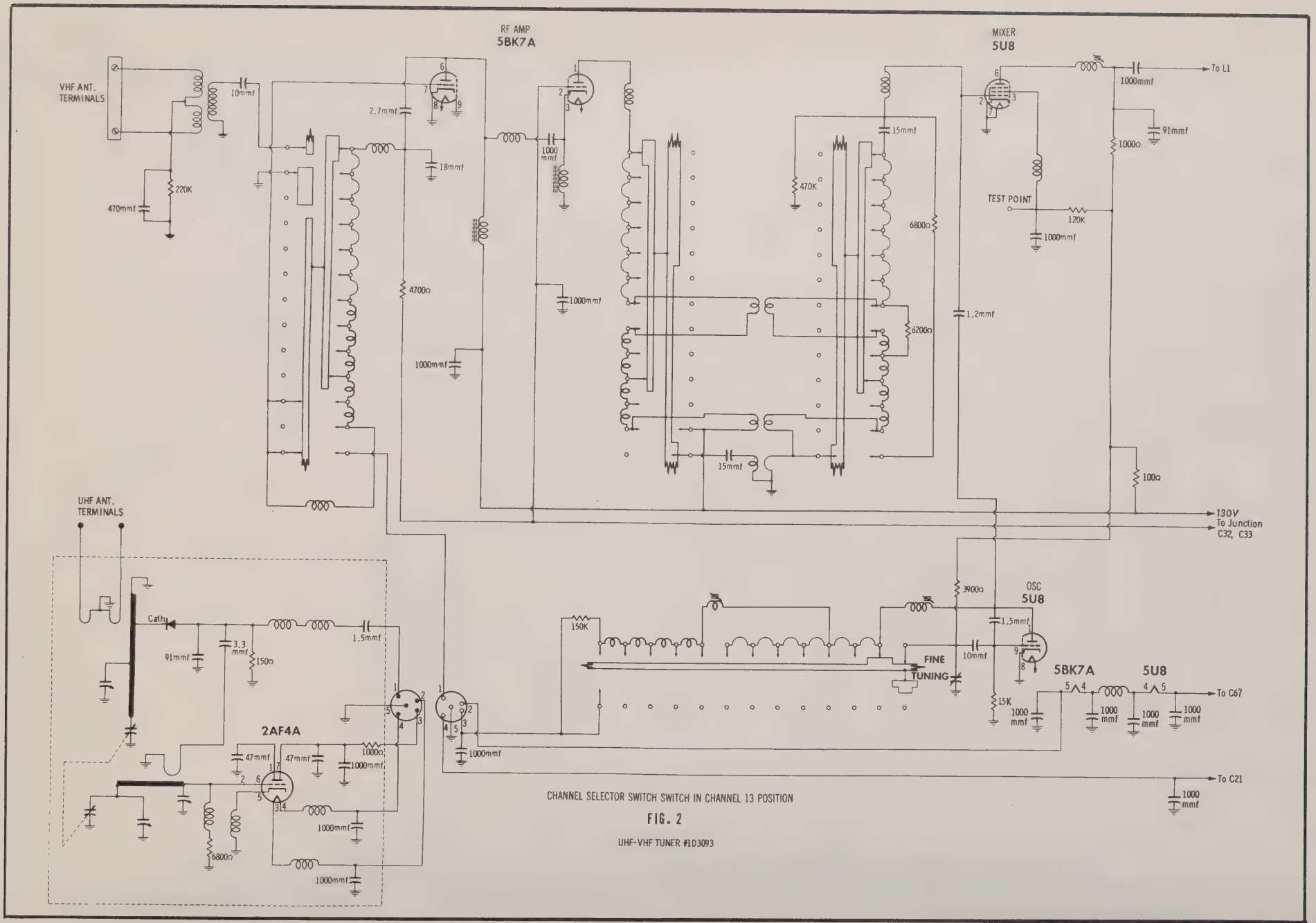


FIG. 1

VHF TUNER #201E055



CHANNEL SELECTOR SWITCH SWITCH IN CHANNEL 13 POSITION

FIG. 2

UHF-VHF TUNER #1D3093

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

BELL SOUND
MODELS BT-205IB, BT-205OB

BELL SOUND
MODELS BT-205IB, BT-205OB

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3924 MEADE ST.
DENVER, COLORADO

BELL SOUND
MODELS BT-205IB, BT-205OB

GENERAL INFORMATION

The "Bell" Models BT-205IB and BT-205OB are designed for two-channel Stereophonic sound reproduction.

The Major difference in the models is that Model BT-205IB recorder plays "in-line" head (sometimes called stacked head) tapes. The Model BT-205OB recorder plays "Offset"head (sometimes called "staggered"head) tapes.

Since most stereo tapes are now available either for "in-line" heads or the "offset" heads, be certain to specify which type is desired depending on whether you have the "in-line" Model BT-205IB or the "offset" Model BT-205OB. The recorders or not designed for making stereo tape recordings, only for playback of stereo tapes. You also can make and playback your own tapes, using only half the width of the tape at a time.

The "Bell" Models have two tape speeds, 7 1/2" and 3 3/4" per second. Using both tracks the recording time is as follows:

SIZE REEL	3 3/4" SPEED	7 1/2" SPEED
5" (600ft.)	1 hour	1/2 hour
7" (1200ft.)	2 hours	1 hour

The "Bell" Models BT-205IB and BT-205OB are designed to operate on 60 cycle, 110-120 volts, AC supply only.

Manufactured by:
BELL SOUND SYSTEMS, INC.
A SUBSIDIARY OF THOMPSON PRODUCTS, INC.
555 MARION ROAD
COLUMBUS, OHIO

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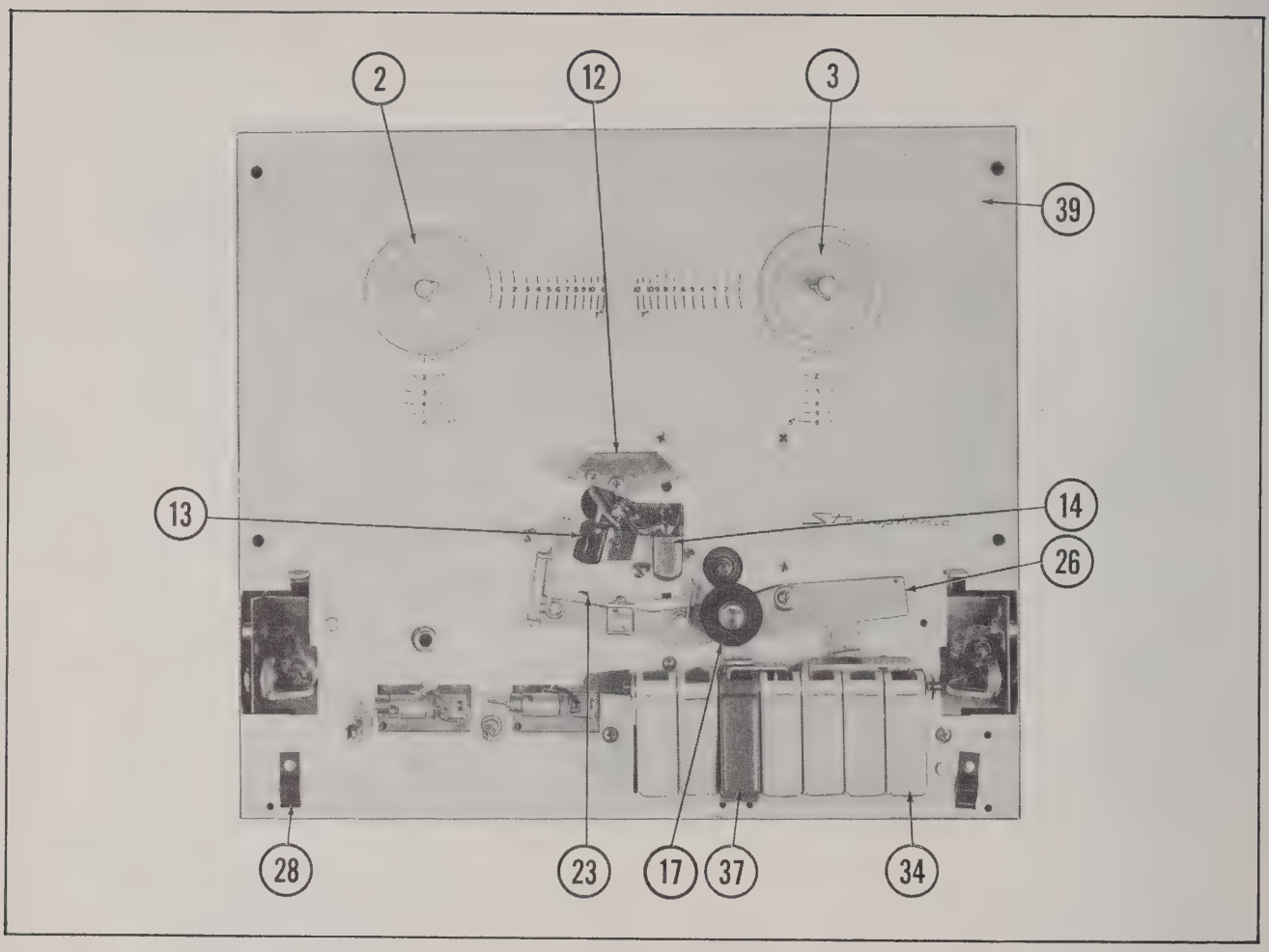

FIGURE 1

STEREOPHONIC OPERATING INSTRUCTIONS

Playback-Stereophonic Tape

Thread the tape on the recorder in the same manner as described under "Threading The Tape" page 3. Make a trial run and adjust the volume controls to produce a balanced, equal output from both channels. Do this with tone controls flat and standing midway between the two loudspeakers. A good approximation is to listen to tape hiss before the music starts, adjusting for equality in both loudspeakers. The stereo tapes should always be rewound back to the left-hand reel immediately after playing.

Connecting Sereophonic Recorder To Speakers

1. Remove the 8ft. shielded cable supplied with the recorder and plug one end into the stereo pre-amp output located at the rear of the recorder. This is #2 channel.

2. Plug the opposite end into a "Bell" Model 305-D Sound Cabinet, or

(a) A Hi-Fi amplifier-use the **auxiliary,** radio, tape or TV input.
(b) A TV set-use the phono input.
(c) A Record Player or Combination Radio, Record Player-use the auxiliary or external input.

3. The #2 channel should be reproduced on the right hand side, the #1 on the left. The #1 channel will be reproduced through the loudspeaker in the recorder, unless a separate external speaker is plugged into the external speaker jack. Inserting the plug will silence the speaker in the recorder. If desired, for still finer results, another external amplifier can be used to reproduce the #1 channel in the same manner as for the #2 channel above, by using the (external) amplifier jack. In this case, only the pre-amplifier in the recorder is used and the volume control on the recorder should be turned to zero, thus eliminating any distortion that may occur in the output section of the recorder amplifier.

4. The Bell Model 305D is ideal for reproducing the #2 channel externally-also the #1, because it is designed to match the output of the recorder.

5. It is not necessary for both loudspeakers to be identical but best results are had if both are of similar type, i.e. single cone, 2 way, etc. Both channels should be capable of reproducing the full frequency range as nearly as possible since fidelity will improve with increased range as in single channel reproduction. However, experience has shown that restrictions in response will not be nearly as evident with stero as with monaural reproduction.

Preparing For Operation —

1. Open and remove the lid by sliding it to the right of the hinges. Place the recorder on a hard flat surface so that the feet will allow air to enter the bottom grille for ventilation.

2. Insert the AC power cord plug into a convenient 110-120 volt, 60 cycle AC outlet.

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Threading The Tape —

Place a reel of "A" wind tape (glossy side out) on the supply reel platform (2). Turn the reel while pressing down lightly so that the three slots in the reel hub engage the three keys on the reel platform. Place an empty reel on the take-up reel platform (3) and draw the end of the tape across and into the hub of the empty reel. Insert the end of the tape into one of the slots in the hub of the empty reel and rotate reel counter clockwise until tape is secured to hub. Drop the tape into the tape slot and take up slack in tape before turning unit on.

NOTE: This machine will operate in either a horizontal or vertical position. When operating with the front panel in a vertical position, use the two rubber reel spindle tips to hold the reels firmly on the spindles. Remove these (pull off) when loading tape on machine.

To Record From Microphone —

Depress the "Stop" key, then turn on the recorder by rotating the "Tone" control clockwise. Depress the desired speed key and allow approximately 30 seconds for the unit to warm up. Insert the microphone plug into the Mic. jack. Next, pull the record lock (30) toward the front of the case and depress the red record key. The tape will move and all sounds striking the microphone will be recorded on the tape if the "Volume" control is turned up sufficiently. The correct volume control setting is that which causes the record level lamp (located under the "Volume" control knob) to flash on peak sounds. If the lamp fails to light, volume is too low. If the lamp flashes constantly, volume is too high. The "Volume" control should be set from 1/2 to 3/4 of maximum.

To Record From Radio, Phono or TV —

The most satisfactory method is to connect the "Radio" input of the recorder to the radio or TV voice coil terminals.

In the case of an AM-FM Tuner, connect to the tuner output where there are no tone controls in the circuit. If this is not feasible, be sure tone controls are in a flat position. Also, cut out any loudness controls since these accentuate bass and treble frequencies.

To record from a phonograph equipped with a crystal cartridge, connect the cartridge directly into the "Radio" input on the recorder. When using a magnetic cartridge, connect a preamp between the cartridge and "Radio" input on the recorder.

After the proper connections are made, proceed with the recording as described under "To Record From Microphone".

NOTE: In order to obtain the best recording quality, volume control on the BT-205 should be at a 50% setting or above when the record level lamp flashes on peak sounds. If the volume control, when recording, must be turned down to a low setting (say 1/4 of the way up or 25%) to obtain proper flashing of the lamp, it means that the signal being fed into the recorder is too high. To avoid possible distortion, place the microphone farther away from the source, or turn down the volume of the radio or phonograph so that the BT-205 volume control can be advanced to 50% or higher for proper recording level.

Dual Track Operation —

When recording has used up the full tape length, except for a few turns on the supply reel (left hand side), turn reels over and exchange end for end placing the now full reel on the supply platform and the now empty reel (except for a few turns) on the take-up platform. Proceed with the recording as described under "To Record From Microphone".

Either track may be played back at any time by turning the reels over and exchanging platforms.

To Rewind —

After recording is made, press the "Stop" key all the way down, then depress the "Rewind" key. When desired portion of tape is rewound, push down "Stop" key. Wait for the tape to stop before pressing the "Play" key.

To Play a Recording —

1. To play back a tape recorded on the BT-205 or to play a commercial pre-recorded tape, install reels on platforms and thread as for recording. Turn unit "On", select proper speed, and depress "Play" key. Adjust "Volume" and "Tone" controls for desired listening level. After playing, depress the "Stop" key.

2. To play back second track, turn reels over and place on opposite reel platforms. This may be done at any time during playback.

To Use External Speaker —

Recordings may be played back through an external speaker by inserting a phone plug in the speaker jack. This jack when used, disconnects the built-in speaker.

To Use External Amplifier —

Recordings may be played back through a Hi-Fi system by connecting to the "Ampl." output jack. To silence internal speaker while in "Play" position, insert a phone plug, miniature type, into the "Spkr." output

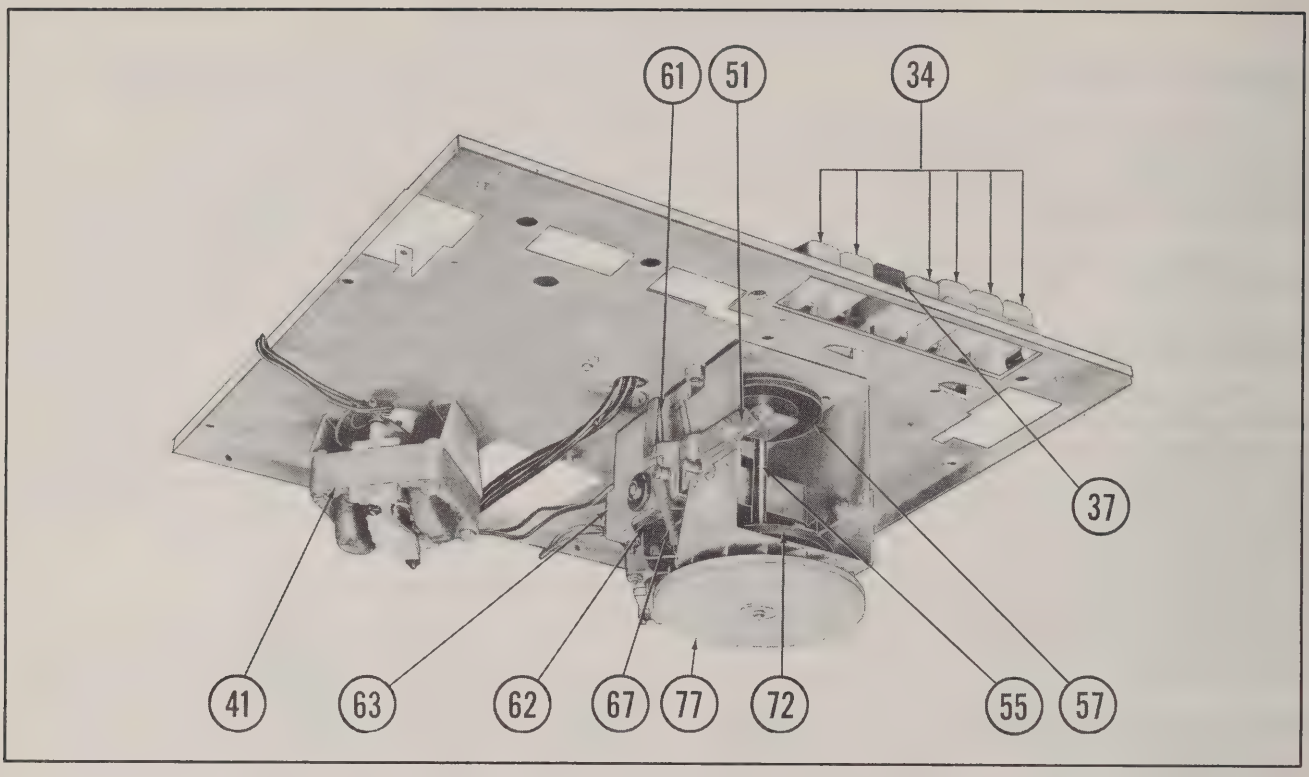

FIGURE 2

jack. For best results, the phone plug should be terminated in a 6 ohm resistor.

Fast Forward –

In playback, it is sometimes desirable to skip portions of tape to a particular spot. To do this, push down "Forward" key until tape arrives at desired spot; then depress "Stop" key. Be sure keys are pressed all the way down. Wait for the tape to stop before pressing the "Play" key.

To Monitor Recordings –

Any signal being recorded may be monitored by plugging high or low impedance phones into the "Spkr." output jack.

An external amplifier may be used to monitor any signals being recorded if connected to the "Amp." jack. An external speaker may also be used. Use "Spkr." output jack.

DISASSEMBLY INSTRUCTIONS

To Remove Recorder From Cabinet –

Remove the four Phillips-head screws located at the edges of the top deck plate and lift the unit straight up from the case. Disconnect speaker leads from speaker before lifting unit completely out of case.

ADJUSTMENTS

Head And Pressure Pad Adjustments –

To properly check head azimuth alignment it is necessary to have a pre-recorded 1 mil alignment tape which results in a 7500 cycle per second signal when operated at 7 1/2 inches per second. Play alignment tape back through recorder with an AC VTVM connected across the speaker or 6Ω load.

CAUTION: Be sure recorder is in "Play" position to prevent erasure of alignment tape.

Three things can cause low meter readings (providing amplifier and tubes are working properly). These are, dirty head, improper pressure pad pressure, or wrong head alignment angle. Check these things as follows:

1. Check head to be sure there is no dirt on the pole pieces or bakelite portion. Dirt holds the tape away from the pole pieces and lowers output. If head is dirty, clean with head cleaning solvent or alcohol. Wipe dry immediately after cleaning.

2. Check that pressure pads (23) covers the head pole faces. The pressure at the heads should be between 20 and 30 grams. Bend pads spring only when necessary, avoiding odd-appearing kinks in the spring.

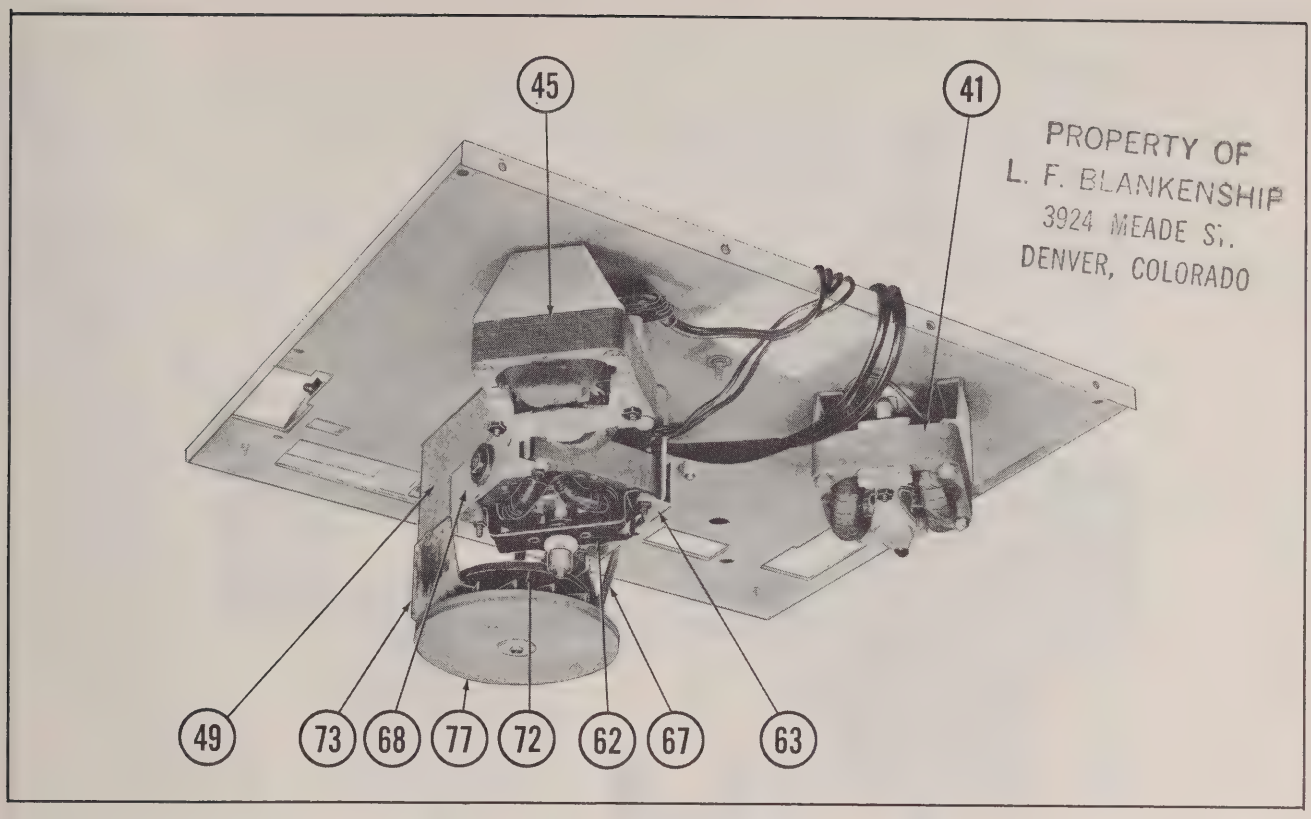

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FIGURE 3

3. To adjust head alignment by means of tape guide heights without destroying the correct nominal tape height at the head, proceed as follows:

Set both left and right tape guides (29) to .486" (at top surface) off of panel. With head fully seated, run the 7500 cycle alignment tape through the machine with the "Volume" and "Tone" controls full on. Adjust the left tape guide by rotating not more than plus or minus 1/2 turn (±.016"). If this fails to produce a peak voltage reading on the AC vacuum tube voltmeter, adjust the right tape guide by not more than ±1/4 turn (±.008"). This amount of adjustment will tilt the tape by more than the normal head mis-alignment and if no peak is reached either the head is not fully seated or the head mounting plate (14) is bent, or the head itself is worn. Tape position must be such that, when playing back a tape having the opposite track recorded to normal level no crosstalk will be audible in the play-back (slight crosstalk may be audible in ideal listening conditions).

Reel Platform Adjustment –

The reel platforms (2 and 3) must clear the deck plate by 1/32" minimum – 1/16" maximum and both reel platforms must be the same height on a given machine. Adjustment is made by loosening set screw (4) and positioning reel platform (2) or (3) to the correct height. After adjustment is made, tighten set screw (4).

Hum Adjustments –

Measure hum output voltage across 6Ω load, "Volume" control maximum and "Tone" control minimum.

The hum balance control (R3) on the amplifier should be adjusted first for minimum amplifier hum but will probably have to be slightly re-adjusted for lowest overall hum, i.e., the hum voltage will help cancel hum induction into the head from the power transformer and motors. Minimum hum voltage in playback is obtained by correctly polarizing the power transformer and motors, correctly polarizing the line cord plug, adjusting the hum balance pot for minimum hum, and selecting the pre-amp tube (V1) if necessary.

Procedure for Motor Phasing – in "Play" Position But Without Tape.

1. With all motors disconnected and the head shorted, the amplifier should have only a 10 to 15 mv hum output. With the head connected, hum is from the power transformer and should be under 50 mv. This can be reduced by shimming the transformer mounting spacers to tilt the transformer (only necessary in extreme cases).

2. Plug in the take-up motor (45) in the direction giving lowest hum. Check hum balance control (R3).

3. Plug in capstan motor (62) in the direction giving lowest hum – do not change take-up motor connections. Check hum balance control (R3). Brown wire on common should be minimum.

4. Plug in rewind motor (41) in the direction giving lowest hum. This motor will introduce 120 cycle hum which will not be helped by the hum balance control, however it sometimes affects hum balance slightly and the hum control should be adjusted after this last motor is connected.

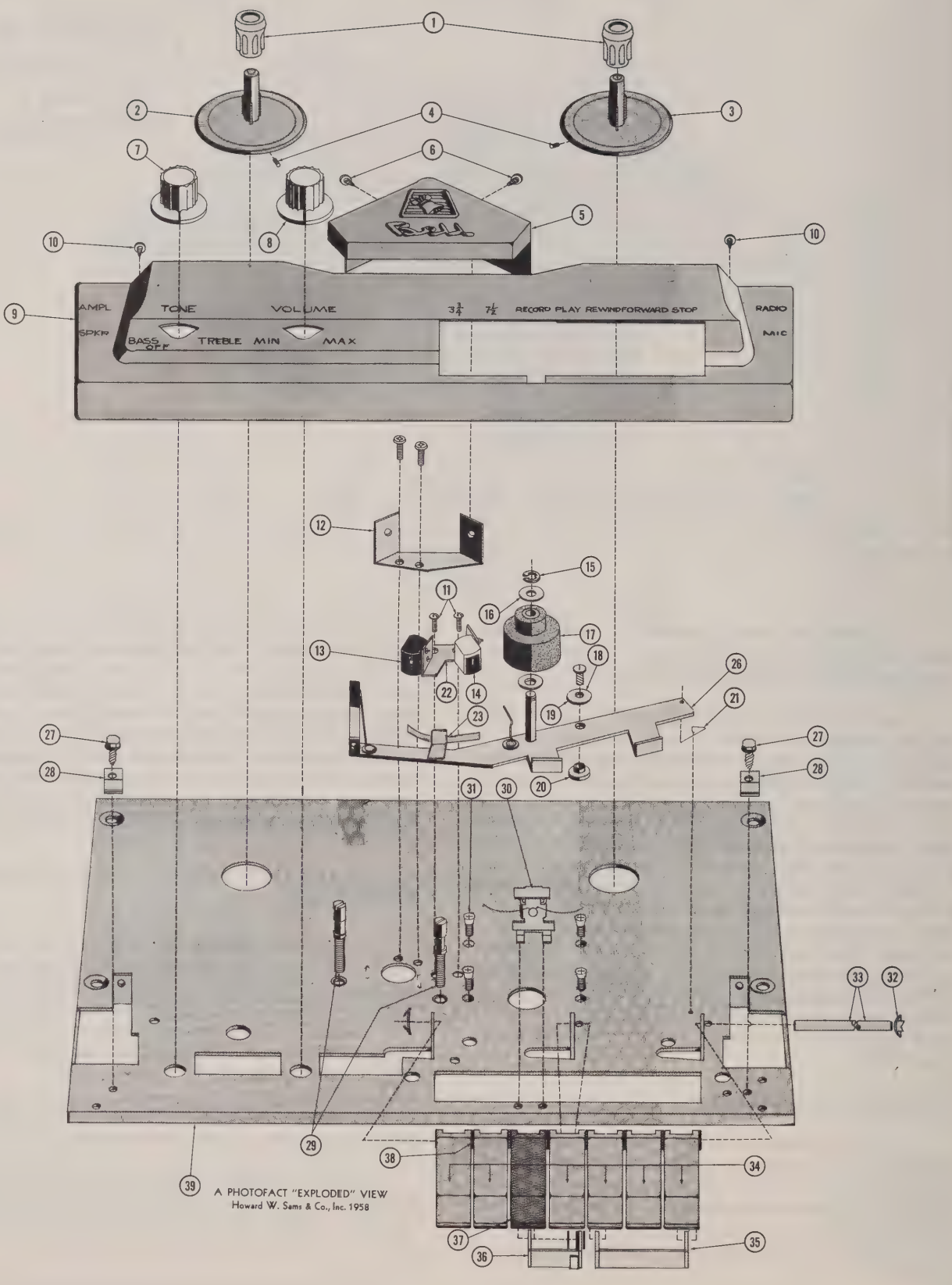


FIGURE 4A. EXPLODED VIEW OF PARTS ABOVE BASEPLATE.

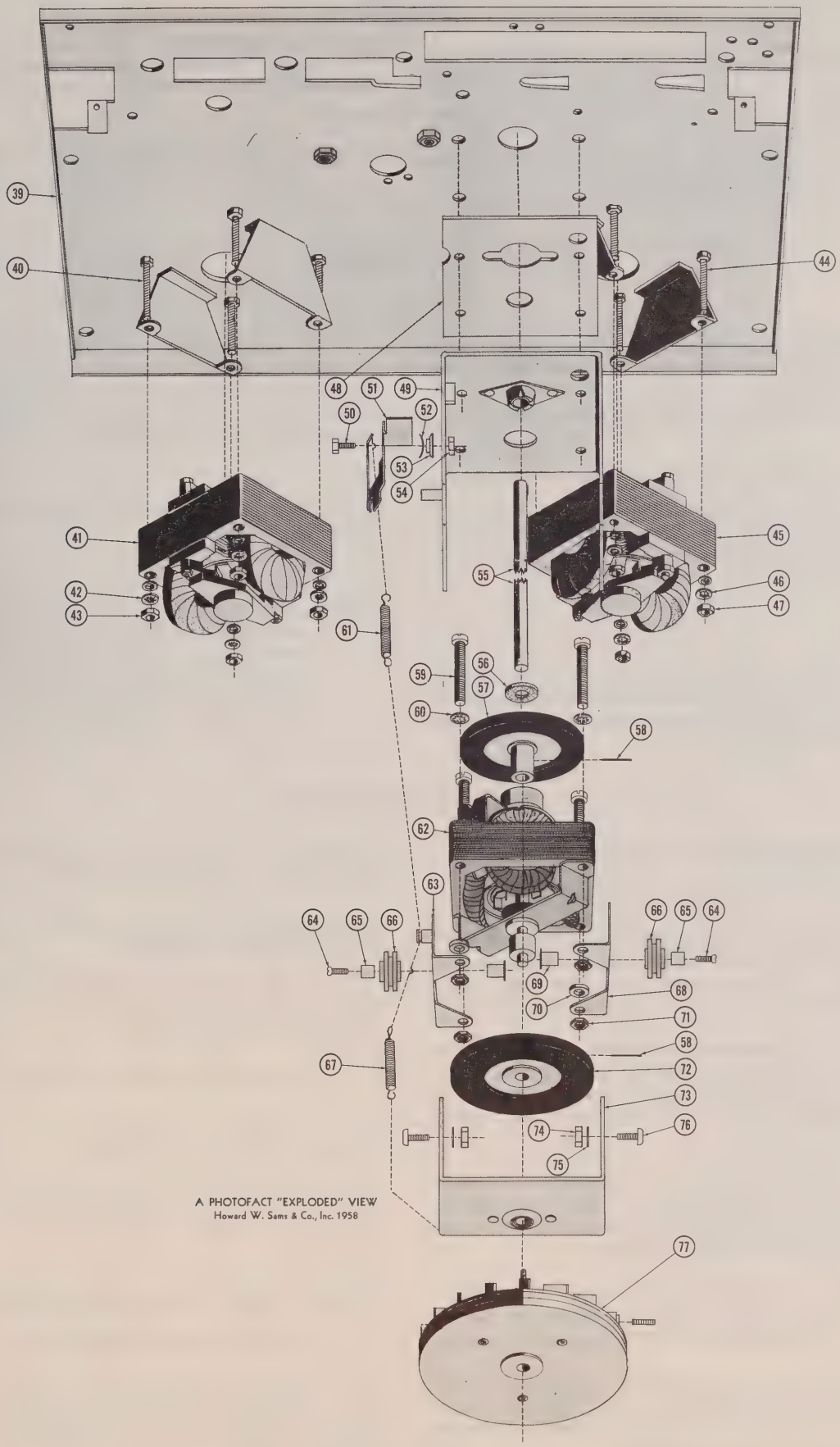


FIGURE 4B. EXPLODED VIEW OF PARTS BELOW BASEPLATE.

CLEANING

The capstan shaft (portion extending above top deck plate), pressure roller (17), tape guides (29), and erase head (13), playback head (14) are subject to an accumulation of tape coating oxide which is worn off the tape as it passes these parts. These parts should be cleaned approximately every ten hours of running time. All of these parts except the pressure roller (17) may be cleaned with head cleaning solvent, alcohol, or carbon tetrachloride. Use alcohol or water when cleaning the pressure roller; never use carbon tetrachloride when cleaning any rubber driving surface.

Caution: To prevent scratching the heads pole pieces, never use a metal tool when cleaning the heads.

LUBRICATION

Lubricants applied at time of manufacture are sufficient to last for a long period of time, but in case parts are replaced, or after each 1000 hours of operation — more or less, lubricate as follows:

1. Apply one drop of #10 motor oil to the top and bottom bearings of the take-up motor (45) and the rewind motor (41). An oiling hole is provided in each bearing holder casting.

2. Apply one drop of #10 motor oil to the top and bottom bearings of the capstan motor (62). Caution: After oiling this motor, be certain that no oil seeps onto the motor pulleys.

3. Apply one drop of #10 motor oil to the top and bottom capstan bearings. Caution: After oiling these bearings be certain that no oil seeps onto the rubber idlers (57 and 72) or onto the portion of the capstan shaft which extends above the top deck plate.

4. Apply one drop of #10 motor oil to the pressure roller bearing (17).

NOTE: Only a very small amount of oil is needed on each bearing. It is desirable to use too little rather than too much for less trouble is likely to result. Oil on the running surfaces between the motor pulleys and the rubber idlers is often a cause for poor or no drive as well as excessive wow and flutter.

TROUBLES AND REMEDIES

Poor Tape Drive In Play and Record —

Poor tape drive can be caused by:

1. Oil or grease on the driving surfaces of capstan drive wheel (57) and the upper pulley on the capstan motor (62). This will cause poor tape drive when operating in the 7 1/2 inch per second speed position.

2. Oil or grease on the driving surfaces of the capstan drive wheel (72) and the lower pulley on the capstan motor (62). This will cause poor tape drive when operating in the 3 3/4 inch per second speed position.

3. Oil, grease or tape coating oxide on the pressure roller (17) and the upper portion of the capstan shaft will cause poor tape drive in both the 3 3/4 and 7 1/2 inch per second speed position.

CAUTION: Use alcohol or water when cleaning rubber driving surfaces. Never use carbon tetrachloride when cleaning rubber parts.

4. Spring (67) disconnected or missing. If this spring is disconnected there will be no tape drive when operating the recorder in the 7 1/2 inch per second speed position. Replace spring (67).

5. Spring (61) disconnected or missing. If this spring is disconnected there will be no tape drive when operating the recorder in the 3 3/4 inch per second speed position. Replace spring (61).

Take-Up Reel Will Not Take Up Tape In Play Or Record Position —

1. Set screw (4) in take-up reel platform (3) loose, causing the reel platform to slip on the motor shaft. Tighten the set screw.

2. Resistor (R40) open. Replace.

Recorder Will Not Rewind Tape —

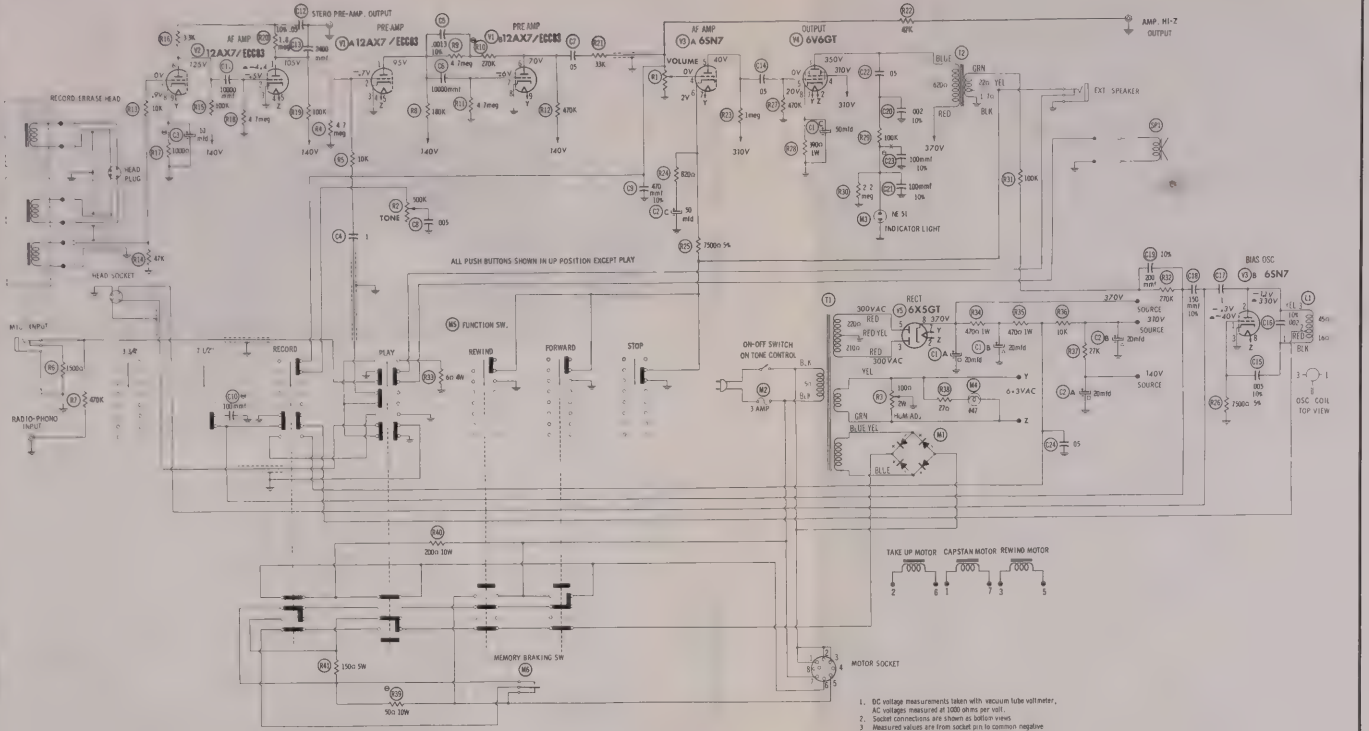
1. Set screw (4) in supply reel platform (2) loose, causing the reel platform to slip on the rewind motor shaft. Tighten the set screw.

Dynamic Brakes Do Not Function Properly —

1. Check selenium rectifier (M1).

2. Check resistors (R41 and R39). If either of these resistors is open, there will be no hold-back tension on the rewind reel when in the "Play" or "Record" mode.

3. If, when going from "Rewind" to "Stop", tape spills from the take-up reel (3), check resistor (R41).



1. DC voltage measurements taken with vacuum tube voltmeter.
2. AC voltages measured at 1000 ohms per volt.
3. Socket connections are shown as bottom views.
4. Measured values are from socket pin to common negative.
5. Line voltage maintained at 117 volts for voltage readings.
6. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
7. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7/ECC83	*218K	4.7meg	0Ω	12Ω	12Ω	*308K	4.7meg	0Ω	12Ω
V2	12AX7/ECC83	*138K	4.7meg	0Ω	12Ω	12Ω	*138K	37K	1000Ω	12Ω
V3	6SN7	7500Ω	†985Ω	0Ω	0Ω	1.1meg	7500Ω	12Ω	12Ω	
V4	6V6GT	0Ω	12Ω	†620Ω	111K	470K	NC	12Ω	390Ω	
V5	6X5GT	0Ω	12Ω	210Ω	NC	220Ω	TP	12Ω	20K(in all)	

* MEASURED FROM PIN 8 OF V3
† MEASURED IN "RECORD" POSITION
ALL MEASUREMENTS IN "PLAY" POSITION UNLESS OTHERWISE DESIGNATED

4. If, when going from "Fast Forward" to "Stop" tape spills from the rewind reel (2), check resistor (R39).

Normal DC voltages for selenium rectifier (M1) and motors (41) and 45 are as follows:

Selenium rectifier (M1), "Play" position-30 volts DC.

Rewind motor (41), "Play or Record" -8 volts DC.

Rewind motor (41) in "Stop" after "Play or Record" - 28volts DC.

Take-up motor (45) in "Stop" after "Play or Record" -17 volts DC.

Amplifier Tests—

1. Check all tubes, inspect wiring and function switch (M5) for poor or open connections.

2. Test all four jacks for open or shorted circuits. These jacks must not ground against cover plate (9).

3. Refer to schematic for all voltage and resistance readings.

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Pre Amp.	ECC-83	
V2	AF Amp.	ECC-83	
V3	Bias Osc.	6SN7	

ITEM No.	USE	TYPE	NOTES
V4	Output	6V6GT	
V5	Rectifier	6X5GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	BELL SOUND PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■20	450		AFH3-138	BO400	FP234	TMD-50	D-215	
B	▲20	450			BR505	TC39	TD-50-50	MT-0550	
C	50	50							
C2A	■20	450		AFH3-138	BO400	FP234	TMD-50	D-215	
B	▲ 20	450			BR505	TC39	TD-50-50	MT-0550	
C	50	50							
C3	10	10	(Note 1.)	PWE10010	NL10-10	TT12X10	ML10-15		TE-1114

(Note 1.) Some versions may use 40mfd@3V

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

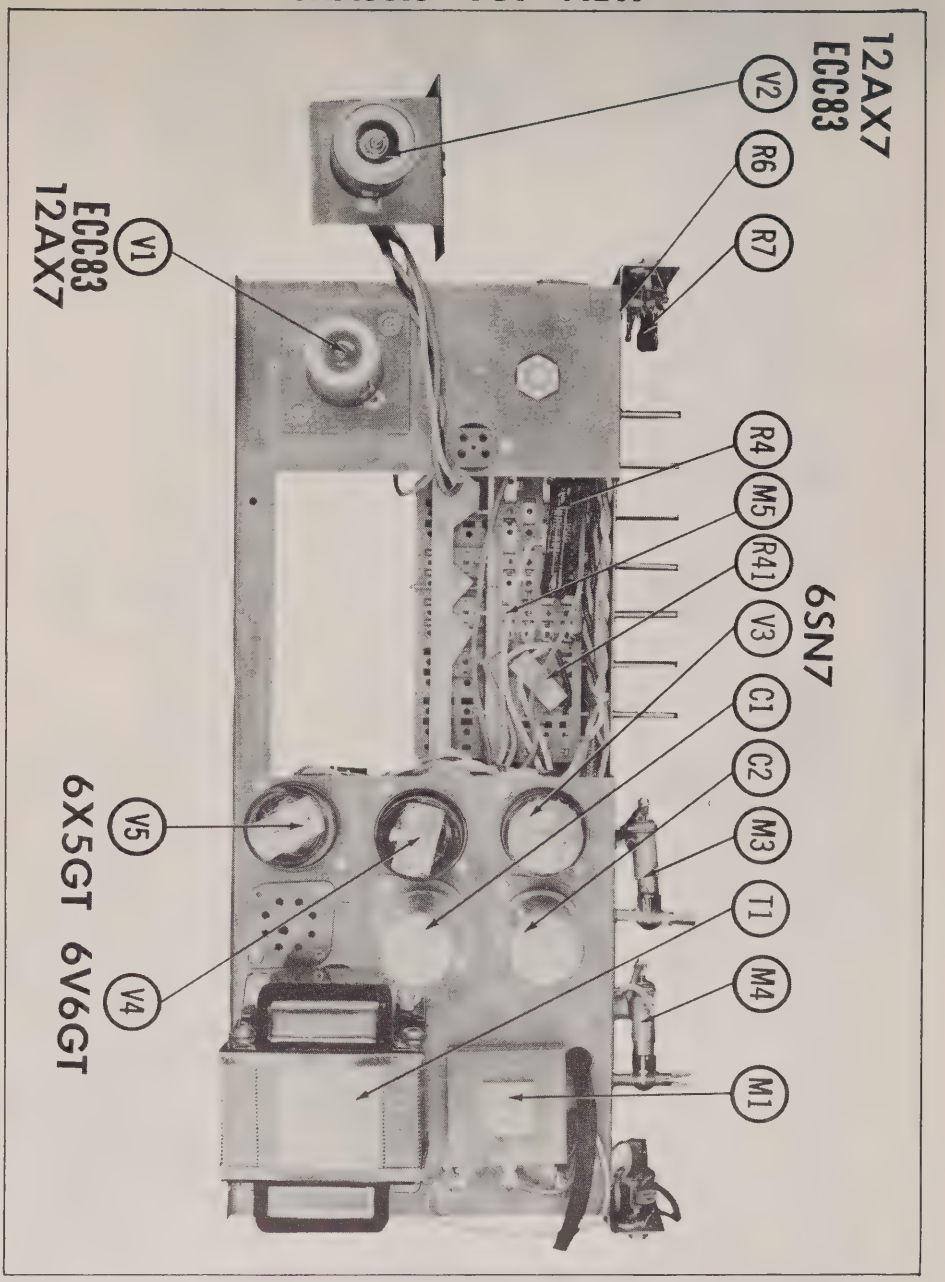
ITEM No.	RATING		REPLACEMENT DATA								NOTES
	CAP.	VOLT	BELL SOUND PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.		
C4	.1	200		P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1		
C5	.0013	400									10%
C6	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1		
C7	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5		
C8	.005	400						GEM-1625			
C9	470			1464-00047	D6-471	5R5T47	ED470		MS-347		10%
C10	100			1468-0001	D6-101	5W5T1	ED-100	MC235	IFM-31		①
C11	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1		
C12	2400					IR5D24			MS-224		10%
C13	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5		
C14	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5		
C15	.005	400						GEM-1625			10%
C16	.002	400									10%
C17	.1	400		P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1		
C18	150			1469-00015	D6-151	22R5T15	ED-105	MCB-236	MS-315		10%
C19	200			1469-0002	D6-201	22R5T2	ED-200	MCB-237	MS-32		10%
C20	.002	400									10%
C21	100			1469-0001	D6-010	22R5T1	ED-100	MCB-235	MS-31		10%
C22	.05	400		P488N-05	DF-503	CUB4S5		GEM-415	4TM-S5		
C23	100			NPO-DI100	DD-101	L10T1	ED-100	ZT-531	5TCC-T1	②	10%
C24	.05	400		P488N-05	DF-503	CUB4S5		GEM415	4TM-S5		

① Some versions use 470mmf in this application
② Not used on some versions

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	BELL SOUND PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	B20066P-106	B-70	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R2A	500K	½	B20066P-108	B-60-S	A47-500K-Z	Q13-133	U48	Tone
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch			Not Req.	SWE-12	76-1	US-26	
R3A	100Ω	2	B20066P-72	WN-101	A43-100	WPK100	C100P	Hum Adj. Wire Wound
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	BELL SOUND PART No.	NOTES
R4	4.7meg			
R5	10K			
R6	1500Ω			
R7	470K			
R8	180K			
R9	4.7meg			
R10	270K			Note 1
R11	4.7meg			
R12	470K			
R13	10K			
R14	47K			
R15	100K			
R16	33K			
R17	1000Ω			
R18	4.7meg			
R19	100K			
R20	1.8meg			
R21	33K			
R22	47K			
R23	1meg			
R24	820Ω			
R25	7500Ω 5%			
R26	7500Ω 5%			
R27	470K			
R28	390Ω			
R29	100K			
R30	2.2meg			
R31	100K			
R32	270K			
R33	6Ω	4		
R34	470Ω	1		
R35	470Ω	1		
R36	10K			
R37	27K			
R38	27Ω			
R39	50Ω	10		Note 2
R40	200Ω	10		
R41	150Ω	5		

Note 1. Some versions use a 220K resistor in this application
Note 2. Some versions use a 5W resistor in this application

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA BELL SOUND PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .42A	620VCT @ .048A	6.3V 2.3A	35V @ .650A	B-20366					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA BELL SOUND PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	8000	6-8Ω	B-20352						

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA BELL SOUND PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	5 1/4"	PM	6-8Ω	B20111P29	52A21Z6.7	

COIL

ITEM No.	USE	REPLACEMENT DATA BELL SOUND PART No.	MEISSNER PART No.	MERIT PART No.	MILLER PART No.	NOTES
L1	Bias Osc.	B23704				* Tapped @ 16Ω

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA BELL SOUND PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.650A	BT-2051B	367M3655	C1BISDELV		

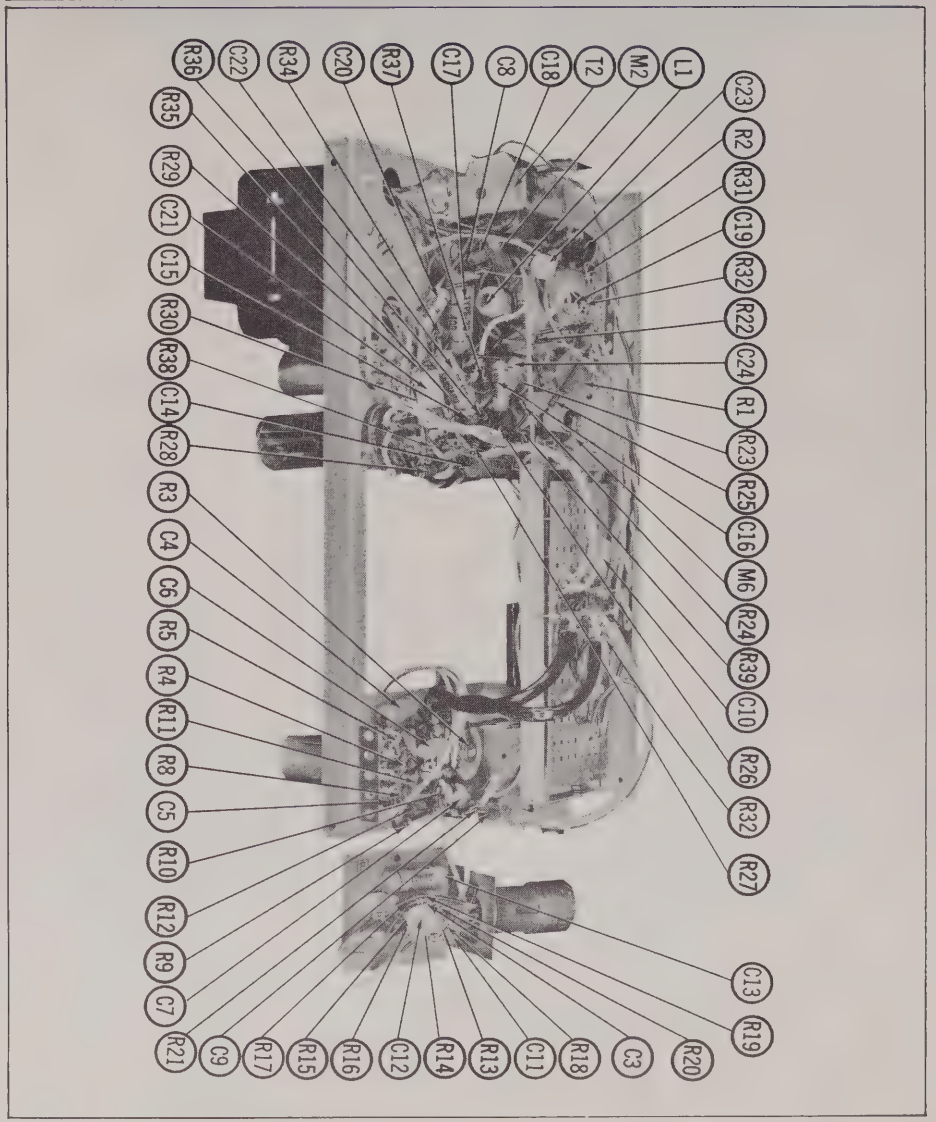
FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA BELL SOUND PART No. FUSE	BELL SOUND PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	3A	3A 250VPT			318003. (3AG 3A 250VPT)		GJV3	

CHASSIS—BOTTOM VIEW

MISCELLANEOUS

ITEM No.	PART NAME	BELL SOUND PART No.	NOTES
M3	Indicator Lamp		#NE-51
M4	Pilot Lamp		#47
M5	Switch	B25251	Function (Slide Contact Tape)
M6	Switch	A25342	"Memory" Braking (Leaf Type)



MECHANICAL PARTS LIST

Ref. No.	Part No.	DESCRIPTION	Ref. No.	Part No.	DESCRIPTION
1		#14 Crutch Tip, 1/4" I.D.	37	A-25268P2	Record Key (Red)
2	A-25328	Reel Platform, Supply	38	B-20089P58	Fibre Washer (13 Used)
3	A-25328	Reel Platform, Takeup	39		Deck Plate Assembly
4		#8-32 x 3/16" Set Screw, Bristol Cup Point	40		#6-32 x 1" Hex. Head Machine Screw
5	B25592	Head Cover (BT205IB Model)	41	B-25400P1	Rewind Motor
	72B21	Head Cover (BT205OB Model)	42		Lockwasher
6		#6 x 1/4" Sheet Metal Screw	43		#6 Hex. Nut
7	B20148P51	Tone Control On-Off Knob	44		#6-32 x 1" Hex. Head Machine Screw
8	B20148P51	Volume Control Knob			
9	D25291	Cover Plate	45	B25400P2	Take-up Motor
10		#6 x 1/4" Sheet Metal Screw	46		Lockwasher
11		Head Mt'g. Bracket Screws	47		#6 Hex. Nut
12	A25319	Head Cover Bracket	48	A-25399	Gasket
13	36X2	Erase Head (Model BT205IB)	49		Motor And Capstan Mt'g. Housing
	B23727P2	Play-Record-Erase Head (Model BT205OB)	50		#6-32 x 1/4" Hex. Screw
14	36X1	Head, Tape-2 Channel Record-Playback (Model BT205IB)	51	**A25394**	Capstan Lever Weld Ass'y.
52					Spring Washer
	36X3	Head-#2 Channel (Model BT205OB)	53		Shoulder Washer
15	A-23822	Retaining Ring	54		#6 Hex. Nut
16	A-23763P2	Nylon Washer	55	B-25390	Capstan Shaft Ass'y.
17	A23518P1	Pressure Roller Assembly	56	B-20089-P26	Felt Washer
18		#6-32 x 1/4" Screw, Phillips Binder Head	57	B-25386P1	Capstan Drive Wheel, $7\frac{1}{2}$ I.P.S.
			58		Roll Pin
19	B-20089P48	Flat Washer	59		#6-32 x 1/4" Rd. Head Machine Screw
20	A-25315	Slide Bearing			
21	A-25270	Pressure Roller Spring	60		Lockwasher
22	72A14	Head Mt'g. Bracket (Model BT205OB Only)	61	A-25397P1	Motor Spring
			62	B-25388	Capstan Motor Assembly
	72A13	Head Mt'g. Bracket (Model BT205IB Only)	63	A-25395	Capstan Motor Support Ass'y.
64		#6-32 x 3/8" Fil. Head Machine Screw			
23		Pressure Pad Spring Ass'y.			
26	91B8	Pressure Roller Lever Ass'y. (Model BT205IB)	65	B-20025P23	Spacer
			66	B-20029P41	Grommet
27		Hex. Head Self Tapping Screw	67	A-25397P2	Motor Srping
28		Cover Plate Retaining Clip	68	A-25382	Capstan Motor Support
29	A-25265	Tape Guide	69		Eyelet
30	A-25391	Record Latch Ass'y.	70	A-25406	Motor Spacer
31		#6-32 x 1/4" Phillips Flat Head Machine Screw	71		#6 Hex. Nut
			72	B-25386P2	Capstan Drive Wheel, 33/4 I.P.S.
32		Tinnerman Push Nut	73	B-25381	Capstan Yoke
33	A-25269	Shaft	74		#8-32 Hex. Nut
34	A-25268P1	Key (6 Used)	75		Lockwasher
35		Stop-Rewind-Forward Key Actuator	76		#8-32 x 3/8" Phillips Head Machine Screw
36		Play-Record Key Actuator	77	A-25257	Flywheel Assembly

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K ($7\frac{1}{2}$ Ft. Length)
Low-Loss Shielded Lead (Interconnecting).....	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT* Folder

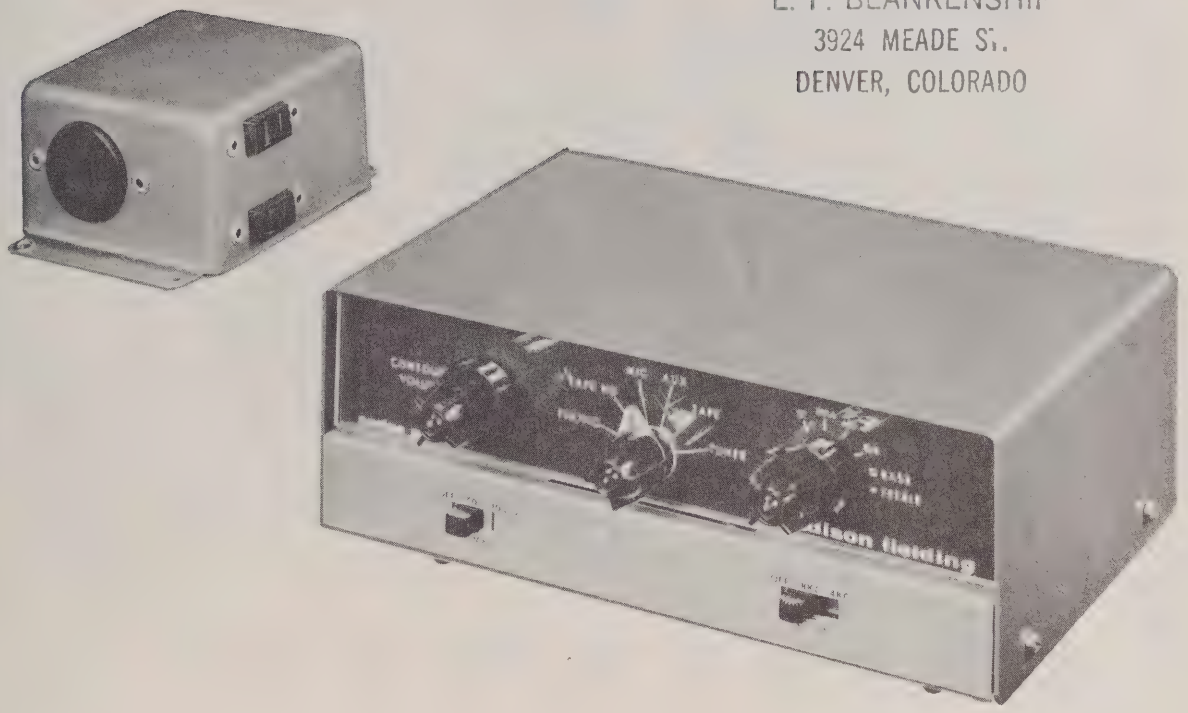
*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

MADISON FIELDING
MODEL PR-45 "Transamp"

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

MADISON FIELDING
MODEL PR-45 "Transamp"



MADISON FIELDING
MODEL PR-45 "Transamp"

TRADE NAME	Madison Fielding Model PR-45 "Transamp"
MANUFACTURER	Madison Fielding Corp., 863 Madison St., Brooklyn 21, N. Y.
TYPE SET	AC Operated 6 Channel Preamplifier With Transistorized Input
TUBES (One)	Type 12AX7/ECC83 AF Amplifier
POWER SUPPLY	105-125 Volts AC-50/60 Cycles RATING .10 Amp. @ 117 Volts AC (6 Watts)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H277

FOLDER 7

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	AF Amplifier	12AX7/ECC83

ITEM No.	USE	TYPE

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N35	AF Amplifier	2N439		2N35	
X2	2N35	AF Amplifier	2N439		2N35	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Madison Fielding PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	20	200	CE202010						R2472 ■
B	20	200							
C	20	150							
C2	2	15		PWE25002			ML2-15		R2473 *
C3	2	15		PWE25002			ML2-15		R2473 *
C4	150	2		PWE3200					R2474 *
C5	150	15							R2475 *
C6	150	20		PRS50V150	BR2502				R2476 *
C7	2	25		PRS50V2	BBR2-50	TC302	TD-2-25	MT-0502	R2477 *
C8	25	3		SRE3V25	BBR25-3	TT3X25	ML25-3	MMT-325	TE-1055
C9	25	3		SRE3V25	BBR25-3	TT3X25	ML25-3	MMT-325	TE-1055

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Madison Fielding PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C10	3500					1R5D36			MS-235	10%
C11	8700									10%
C12	3500					1R5D36			MS-235	10%
C13	20000			BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C14	20000			BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C15	.1	200		P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C16	2200			BPD-0022	DD-222	BYA10D22	ED-0022	UC-5222	5GA-D22	
C17	4700			BPD-0047	DD-472	BYA10D47	ED-0047	UC-5247	5GA-D47	
C18	9					C10V9C				NPO
C19	18			SI 18	D6-180	LT6Q18	GP-18	UC-5418	5GA-Q18	
C20	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5GA-S1	
C21	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5GA-S1	
C22	47			SI 47	D6-470	LT6Q47	GP047	UC-5447	5GA-Q47	
C23	.22	200		P288N-22		CUB2P22		GEM-2022	2TM-P22	

CONTROLS

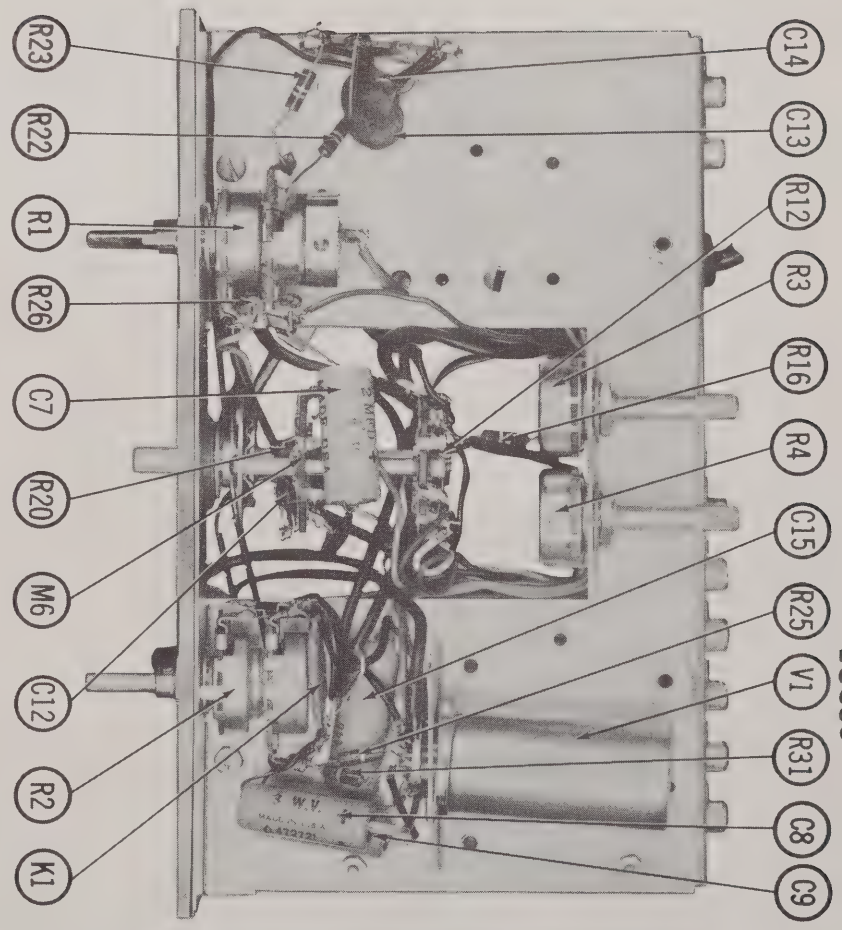
ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Madison Fielding PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	500K	½	RV10502				⟨▲ UE3761S	Volume
B	100K	½						Contour, Tap ② 25K & 50K
C	Switch							
R2A	1meg	½	RV1002	F1-52		⟨ ♦	⟨■ UE3762	Bass
B	500K	½		R4-42				Treble, Tap ② 250K
R3A	470K	½	RV5043	B-59	A47-500K-S	Q11-133	U50	Tuner Adjust
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R4A	25K	½	RV2530	B-26	A47-25K-S	Q11-120	U29	Phono & Low Level Adjust
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R5	500Ω	2	RW5001					Hum Adjust (Wirewound)

♦ Concentrikit Equivalent; K-2 Kit, Base Elements and Shafts: B11-137, P1-200 (Panel) B19-137X, R1-205 (Rear)

▲ STA-LOC Equivalent FB55A, OS500, RU15DT54, IS1125, US-41

■ STA-LOC Equivalent FB16L, OS500, RU55T254, IS1125

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Madison Fielding PART No.	NOTES
R6	270K			
R7	150K			
R8	6800Ω			
R9	100K			
R10	120K			
R11	560Ω			
R12	390K			
R13	18K			
R14	100K			
R15	18K			
R16	100K			
R17	18K			
R18	18K			
R19	22K			
R20	22K			

ITEM No.	RATING OHMS	RATING WATT	Madison Fielding PART No.	NOTES
R21	33K			
R22	10K			
R23	10K			
R24	100K			
R25	2700Ω			
R26	470K			
R27	820K			
R28	220K			
R29	1.8meg			
R30	220K			
R31	1500Ω			
R32	150K			
R33	22K			
R34	10K			

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Madison Fielding PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .100A	155V @ .002A	6.3V @ .300A		TP1003					

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Madison Fielding PART No.	REPLACEMENT DATA
K1	Tone Comp.	4700mmf, 4700mmf, 100mmf, 100K, 470K, 1000Ω		

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Madison Fielding PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.0018A	SR1001		CR28		

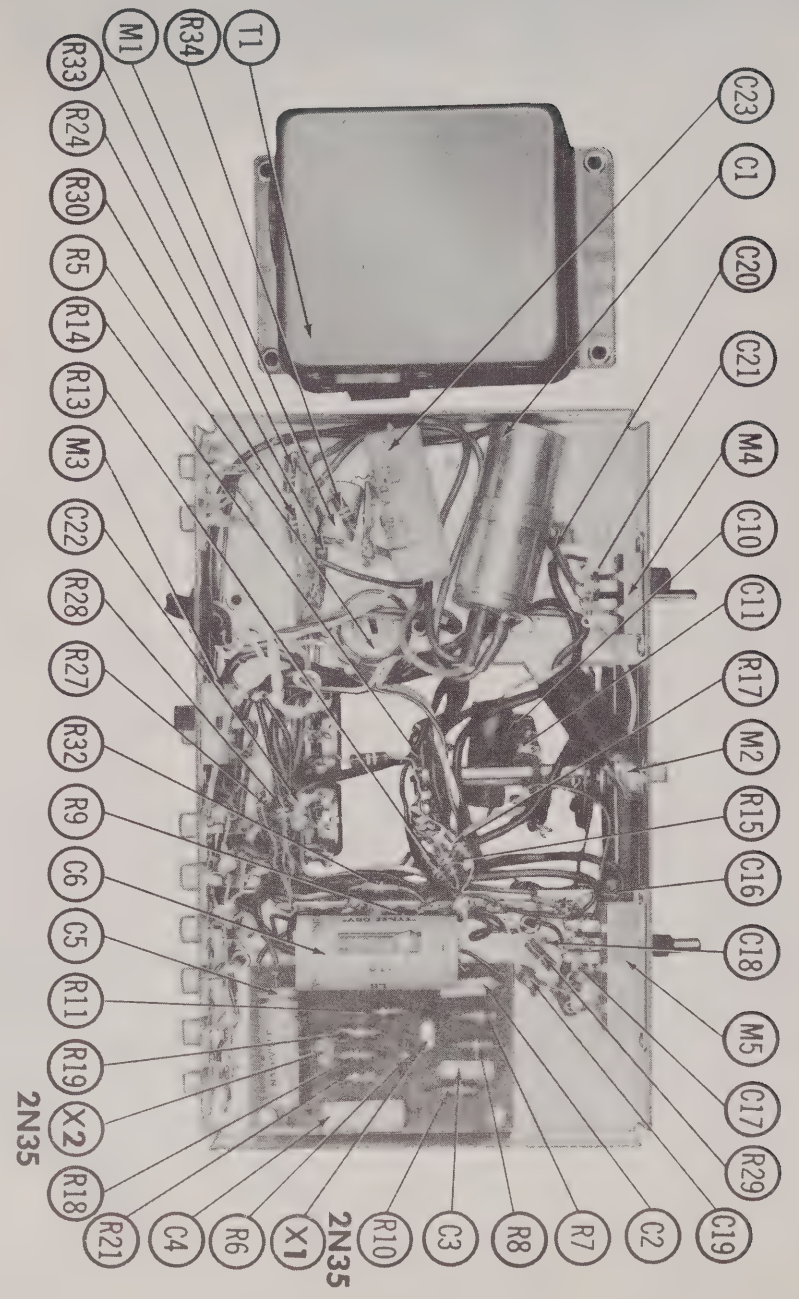
MISCELLANEOUS

ITEM No.	PART NAME	Madison Fielding PART No.	NOTES
M2	Pilot Lamp		#1847
M3	Switch	SS1007	Matched Function (Slide Type SPDT)
M4	Switch	SS1002	Rumble Filter (Slide Type DPDT)
M5	Switch	SS1006	Noise Filter (Slide Type DPDT)
M6	Switch	SF1002	Selector (Rotary Wafer Type)

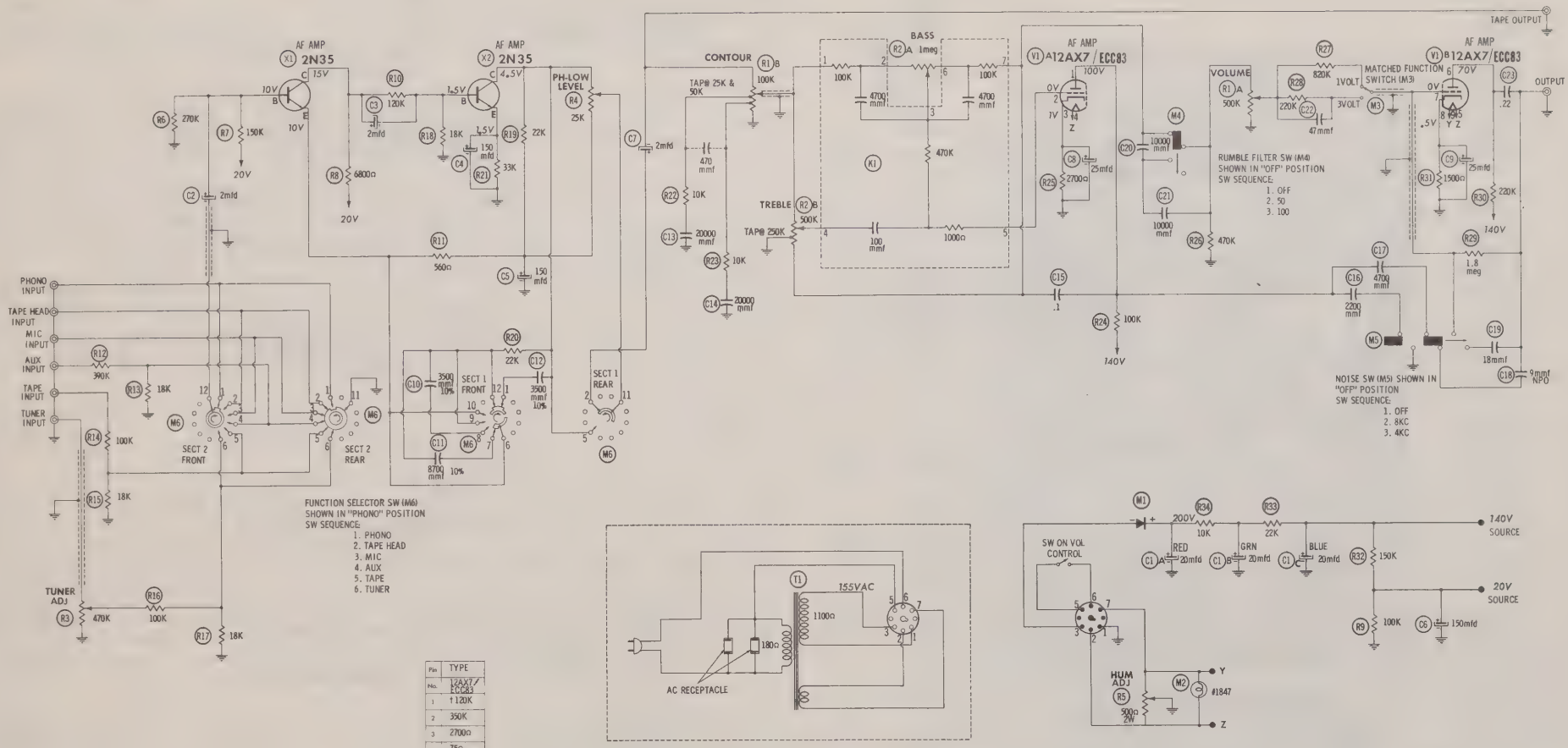
WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW



FOLDER 7



Pin No.	TYPE 12AX7/ECC83
1	†120K
2	350K
3	2700Ω
4	75Ω
5	75Ω
6	†230K
7	220K
8	1500Ω
9	75Ω

ALL MEASUREMENTS TAKEN IN "PHONO" POSITION
† MEASURED FROM OUTPUT OF M1

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE

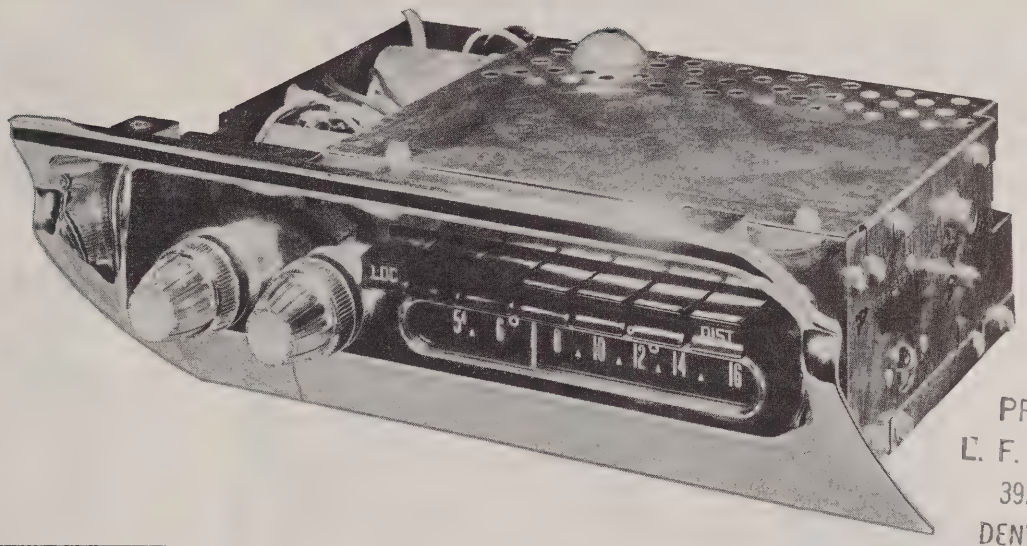
1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

PHOTOFACT* Folder
*TRADE MARK

MOPAR MODELS 917HR (P5703), 920HR (C5707), 921HR (C5709)

MOPAR MODELS 917HR (P5703), 920HR (C5707), 921HR (C5709)



PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

MOPAR MODELS 917HR (P5703), 920HR (C5707), 921HR (C5709)

TRADE NAME	Mopar Models 917HR (P5703) For 1957 Plymouth Automobiles, 920HR (C5707) For 1957 Chrysler Automobiles, 921HR (C5709) For 1957 Imperial Automobiles
MANUFACTURER	Philco Corp., Tioga & "C" Sts., Philadelphia, Pa.
TYPE SET	Battery Operated Custom Built AM Automobile Receiver With Transistorized Output
TUBES (Six)	Types 12BL6 RF Amplifier, 12AD6 Converter, 12BL6 IF Amplifier, 12F8 Det. -AVC-AF Amp., 12AD6 Trigger Detector, 12K5 AF Amp. - Relay Trigger
POWER SUPPLY	12 Volt Storage Battery RATING 2.2 Amp. @ 12.6 Volts DC
TUNING RANGE - BROADCAST	540KC - 1605KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

ALIGNMENT INSTRUCTIONS

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.047mfd	High side to pin 7 (grid) of 12AD6 (V2). Low side to chassis.	262.5KC (400∿ Mod)	Tuning gang fully open	DC probe thru 1.2meg to pin 1 (grid) of 12AD6 (V5). Common to chassis.	A1, A2, A3	Adjust for maximum deflection.
2.	"	"	"	"	"	A4	Adjust for MINIMUM deflection. Repeat steps 1 and 2 until no further improvement is noted.
3.	Fig. 1	Thru dummy to antenna receptacle	1610KC	1610KC	"	A5, A6, A7	Adjust for maximum deflection.

With radio installed in car and antenna fully extended tune in a weak station near 1200KC and adjust A6 for maximum output.

PUSHBUTTON ADJUSTMENT

1. Allow receiver to warm up for 15 minutes. Extend antenna.
2. Pull pushbutton out.
3. Tune manually to desired station.
4. Press pushbutton in firmly.
5. Repeat for remaining pushbuttons.

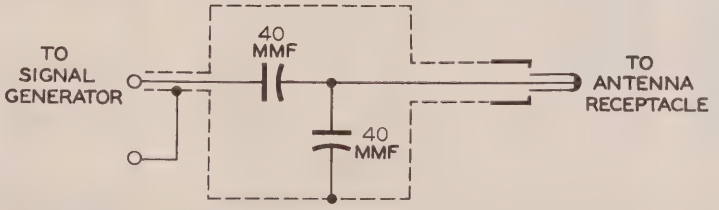


FIG. 1

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BL6	
V2	Converter	12AD6	
V3	IF Amplifier	12BL6	

ITEM No.	USE	TYPE	NOTES
V4	Det. -AVC-AF Amp.	12F8	
V5	Trigger Detector	12AD6	
V6	AF Amp. -Relay Trigger	12K5	

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA			NOTES
			CBS PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	AR6	Output			2N242	Note 1

Note 1. Some versions may use type AR5 or AR7 in this application. Some versions of Model 921HR use two type AR9 transistors in the output stage.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■500	18	61-0086-9	AFH2-02-75		WP200. 7			R2480 *
B	▲200	18							

* Non Catalog Item

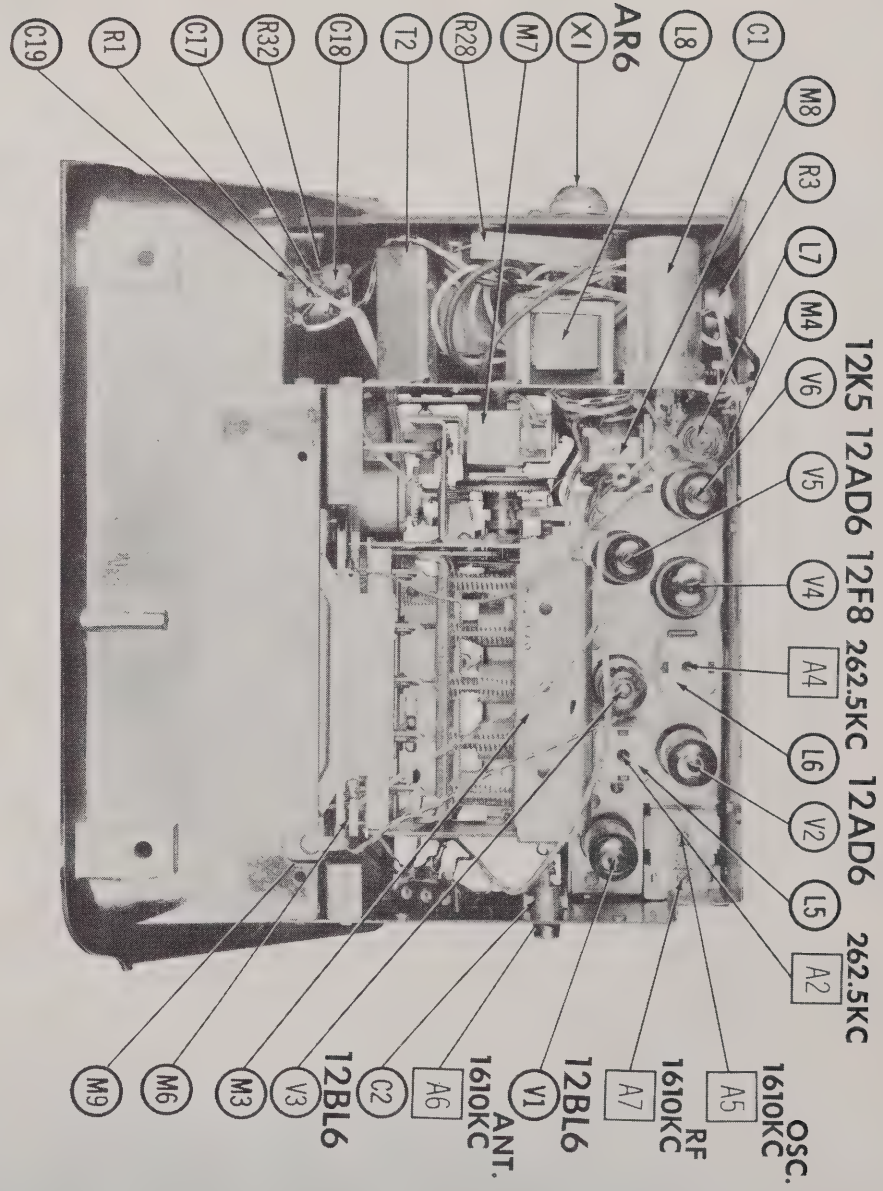
FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	5-65		31-6533-1							
C3	100		30-1251-22	NPO-DI 100	DD-101	L10T1	ED-100	ZT-531	5TCC-T1	10%
C4	10		30-1251-6	NPO-DI 10	DD-100	L10Q1	ED-10	ZT-541	5TCC-Q1	①
C5	. 047	200	30-4650-45	P288N-047	DF-503	CUB2S47		GEM-4147	2TM-S47	
C6	. 047	200	30-4650-45	P288N-047	DF-503	CUB2S47		GEM-4147	2TM-S47	
C7	10000		30-1238-2	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	②
C8	33		30-1251-9	BPD-000033	DD-330	L10Q33	ED-33	UC-5433	5GA-Q33	
C9A	10-95		31-6522-8							
B	315-330									
C	100									
C10	100		30-1251-22	N750-DI 100	TCN-100	C10T1U	TC7-100	NT-531	5TCU-T1	N750
C11	10000		30-1238-2	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C12	.1	200	30-4650-47	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	③
C13	220		30-1238-4	BPD-00022	DD-221	L10T22	ED-220	UC-5322	5GA-T22	④
C14	100		30-1238-11	BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C15	100		30-1238-11	BPD-0001	DD-101	L10T1	ED-100	UC-531	5GA-T1	
C16	1000		30-1238-3	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C17	39		30-1251-21	SI 39	DD-390	L10Q39	ED-39	UC-5439	5GA-Q39	⑤ ⑥
C18	1000		30-1238-3	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	④ ⑦
C19	4000		30-1238-18	BPD-004	DD-402	BYA10D4	ED-004	UC-524	5HK-D4	
C20	1000		30-1238-2	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	⑥
C21	.1	200	30-4650-47	P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	
C22	1000		30-1238-3	BPD-001	DD-102	BYA6D1	ED-1000	DC521	5HK-D1	
C23	. 047	200	30-4650-45	P288N-047	DF-503	CUB2S47		GEM-4147	2TM-S47	
C24	220		30-1262-2	BPD-00022	DD-221	L10T22	ED-220	UC-5322	5GA-T22	⑥
C25	. 5	100		P288N-5		CUB2P5		GEM-205	2TM-P5	④

① Early Model 921HR uses 5mmf in this application.
② Not used in early Model 921HR.
③ Late Model 921HR uses 10000mmf in this application.
④ Not used in some versions.
⑤ Some versions use 200mmf in this application.
⑥ Not used in late Model 921HR.
⑦ Some versions may use 5000mmf in this application.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	PHILCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	4meg	½	33-5580-15					Tone ①
B	2meg	½						Volume, Tap ③ 500K
C	Switch							
R2	150Ω	2	33-5591-3		39-150		FL-150	Trigger Bias (Wirewound) ②
R3	15Ω	2	33-5591-2					Emitter Bias (Wirewound)

① Tone control (R1A) open in center, 2meg each side of center.
Some Model 917HR use Part #33-5580-17 (R1B 1meg).
Some Model 920HR use Part #33-5580-13 (R1B 3meg). Others use Part #33-5580-18 (R1B 1meg).
Some Model 921HR use Part #33-5580-14 (R1B 3meg). Others use Part #33-558019 (R1B 1meg).

② R2 may be a 100Ω control connected in series with a 47Ω fixed resistor in some versions.
Early Model 921HR was 82Ω & 47Ω connected in series.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R4	150K		66-4158340	
R5	1200Ω		66-2128340	
R6	680Ω		66-1688340	
R7	56Ω		66-0568340	Note 1
R8	1meg	1/4	66-5108340	
R9	6.8meg		66-5688340	
R10	1.8meg		66-5188340	Note 2
R11	47K		66-3478340	
R12	1.8meg		66-5188340	Note 3
R13	4.7meg		66-5478340	Note 4
R14	1meg		66-5108340	
R15	2.2meg		66-5228340	
R16	100K		66-4108340	Note 5
R17	100Ω		66-1108340	Note 6
R18	1000Ω		66-2108340	Note 7

ITEM No.	RATING		PHILCO PART No.	NOTES
	OHMS	WATT		
R19	10meg		66-6108340	Note 8
R20	22K		66-3228340	Note 9
R21	220K		66-4228340	Note 10
R22	82K		66-382340	Note 11
R23	330Ω		66-1338340	Note 1
R24	330Ω		66-1338340	
R25	56Ω		66-0568340	
R26	680K		66-4688340	Note 12
R27	4.7Ω	1		Note 13
R28	100Ω TC	10	33-1367-2	
R29	0.27Ω	1	66-8273360	
R30	15Ω		66-0158340	Note 7
R31	4.7Ω	1		Note 7 & 14
R32	150K		66-4158340	Note 10
R33	27Ω	2	66-0276340	Note 15

Note 1. Not used in early Model 921HR.
Note 2. Not used in late Model 921HR.
Note 3. Late Model 921HR use 10meg in this application (Part #66-6108340).
Note 4. Late Model 921HR use 47meg in this application (Part #66-6478340).
Note 5. Some versions may use 120K in this application (Part #66-4128340).
Note 6. Early Model 921HR use a variable control in this application.
Note 7. Not used in some versions.
Note 8. Some versions may use 2.7meg in this application (Part #66-5278340).
Note 9. Not used in Model 921HR. Other Models may use 6800Ω in this application (Part #66-2688340).
Note 10. Some versions may use 100K in this application (Part #66-4103340).
Note 11. Some versions may use 68K in this application (Part #66-3688340).
Note 12. Some versions may use 2.2meg in this application (Part #66-5228340).
Note 13. Some versions may use 10Ω in this application (Part #66-0108340).
Note 14. Some versions may use 20Ω 7W in this application (Part #33-1335-143).
Note 15. Omitted in versions using two dial lamps.

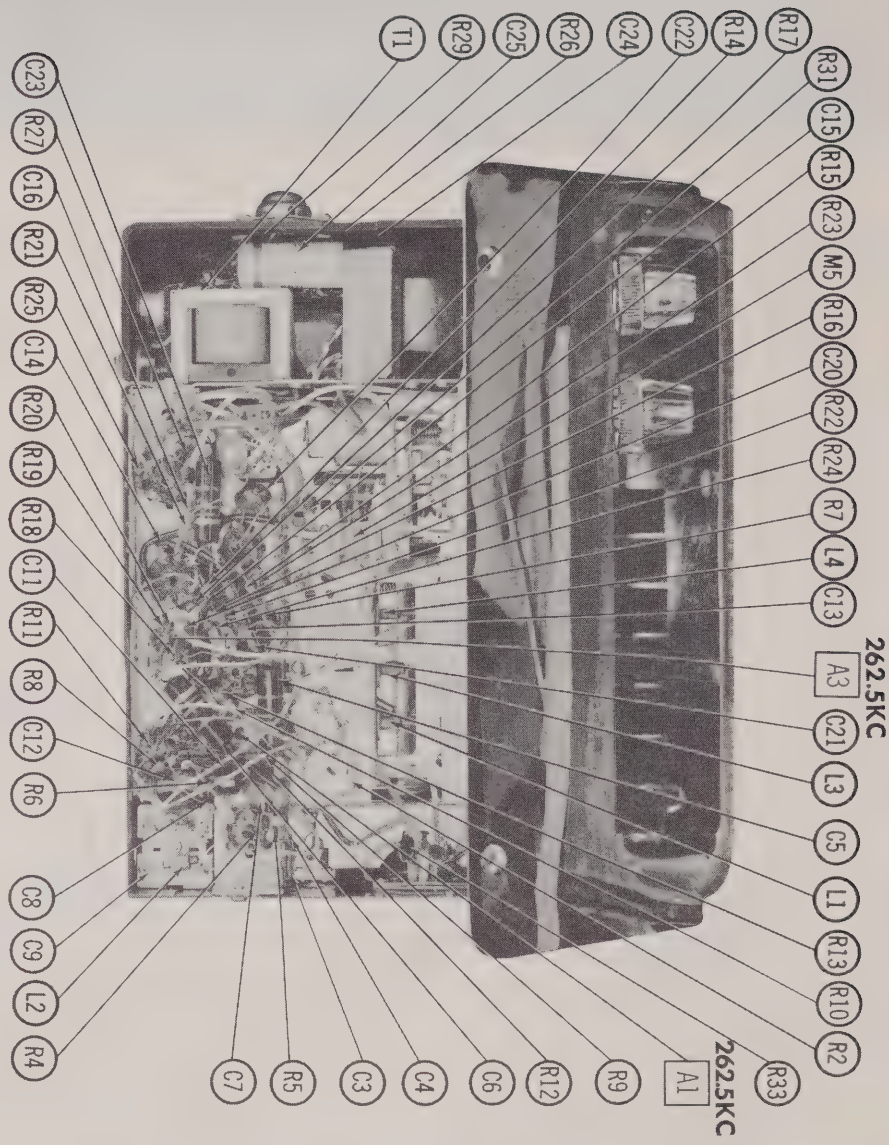
TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA						NOTES
	PRI.	SEC.	PHILCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	4:	1	32-8794 ①						① Alternate Part #32-8821. Part #32-8835 used in Model 921HR with Push-Pull output.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	PHILCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	20Ω	3-4Ω	32-8793 ①				TR-58		① Part #32-8834 used in Model 921HR with Push-Pull output.

CHASSIS—BOTTOM VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	PHILCO PART No.	QUAM PART No.	
SP1	5½"X7½"	PM	3-4Ω	36-1670-2	57A15	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		PHILCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Antenna Coil	32-4730-19					
L2	RF Choke	32-4480-24	19-3160	TV-196	6120		150 Microhenries
L3	RF Coil	32-4730-20					
L4	Osc. Coil	32-4730-21					
L5	Input IF	32-4676-2	16-6756	BC-344	12-H1	RF-3	
L6	Output IF	32-4677-3					
L7	Hash Choke	32-4720-3					

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA					
	TOTAL DIRECT CURRENT	D. C. RESISTANCE	INDUCTANCE (0 CURRENT 1000 ∿)	PHILCO PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L8	.011A	19Ω	500 Millihys.	32-8788					

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			PHILCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M1	SFE	7½A 32V	45-2656-53	41-4244-2	30707.5 (7AG 7½A 32V)	155009	SFE 7½	HDH

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M2	Dial Lamp	34-2064	#44 (Two used in Models 920HR & 921HR).
M3	Tuner	76-11550-1	Model 917HR (Complete Assembly)
	Tuner	76-11348-2	Model 920HR (Complete Assembly)
	Tuner	76-11348-1	Model 921HR (Complete Assembly)
M4	Spark Plate	30-1254-1	300mmf
M5	Switch	76-11522	Motor Reversing
M6	Switch Ass'y	76-11411-1	Sensitivity, Model 917HR
	Switch Ass'y	76-11411-2	Sensitivity, Model 920HR
	Switch Ass'y	76-11411-3	Sensitivity, Model 921HR
M7	Tuner Motor	76-11381	
M8	Relay	42-4032	
M9	Clutch Ass'y	76-11519	Magnetic

PARTS LIST AND DESCRIPTIONS (Continued)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	28-11675-1	Tone, Model 917HR
Knob	28-11691	Tone, Model 920HR
Knob	28-11702	Tone, Fader, Model 921HR
Knob	27-4687-24	Tuning, Model 917HR
Knob	27-4687-25	Tuning, On-Off-Volume, Model 920HR
Knob	27-4687-23	Tuning, On-Off-Volume, Model 921HR
Knob	76-11340	On-Off-Volume, Model 917HR
Knob	27-11691	Fader, Model 920HR
Pushbutton	54-6351-2	Local, Model 917HR
Pushbutton	76-11387-2	Local, Model 920HR
Pushbutton	76-11387-5	Local, Model 921HR
Pushbutton	54-6351-3	Distant, Model 917HR
Pushbutton	76-11387-3	Distant, Model 920HR
Pushbutton	76-11387-6	Distant, Model 921HR
Pushbutton	54-6351-1	Station Selector, Model 917HR
Pushbutton	76-11387-1	Station Selector, Model 920HR
Pushbutton	76-11387-4	Station Selector, Model 921HR
Dial Scale	28-11796	Model 917HR
Dial Scale	54-9990	Model 920HR
Dial Scale	54-9998	Model 921HR

WIRING DATA

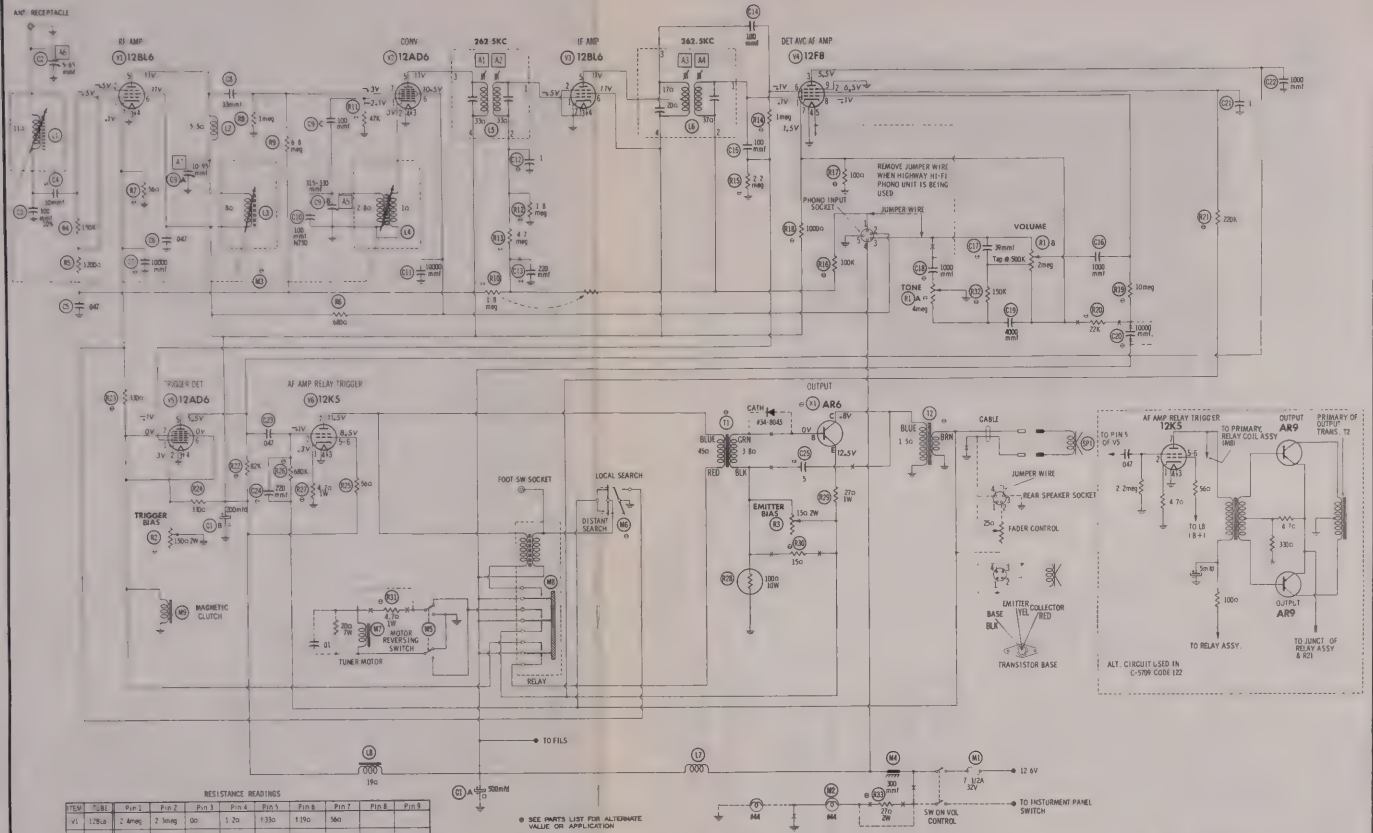
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661

TRIGGER BIAS ADJUSTMENT (R2)

1. Short antenna to chassis.
2. Turn the bias control (R2) clockwise.
3. Press "DISTANT" search button and turn R2 slightly counter clockwise.
4. Repeat step 3 until R2 is adjusted at the point where the tuner continues to search.
5. Turn R2 1/8 turn further counter clockwise.

EMITTER BIAS ADJUSTMENT (R3)

The transistor bias should be checked when the transistor (X1) is replaced. To do this, connect a low range DC voltmeter (not a VTVM) across the primary winding of the output transformer (T2). Apply power to the receiver and allow a 15 minute warm-up period. With the input voltage at 14 volts DC, adjust R3 for a reading of .75 volts on the meter. This is equivalent to a collector current of 750MA.
On models having feedback, R3 should be adjusted for a reading of .85V to .90V. This is equivalent to a collector current of 850MA to 900MA.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12BL6	2.4meg	2.1meg	0Ω	1.2Ω	†33Ω	†19Ω	56Ω		
V2	12AD6	47K	1Ω	1.2Ω	0Ω	*52Ω	*700Ω	1meg		
V3	12BL6	1.3meg	0Ω	0Ω	1.2Ω	*39Ω	†19Ω	0Ω		
V4	12F8	1.2meg	*220K	*82K	0Ω	1.2Ω	3.2meg	100Ω	10meg	0Ω
V5	12AD6	2.2meg	*50Ω	1.2Ω	0Ω	*82K	65Ω	65Ω		
V6	12K5	4.7Ω	680K	1.2Ω	0Ω	†75Ω	†75Ω	†45Ω		

* MEASURED FROM JUNCTION OF L5 AND M4

TRANSISTOR CIRCUIT RESISTANCE NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

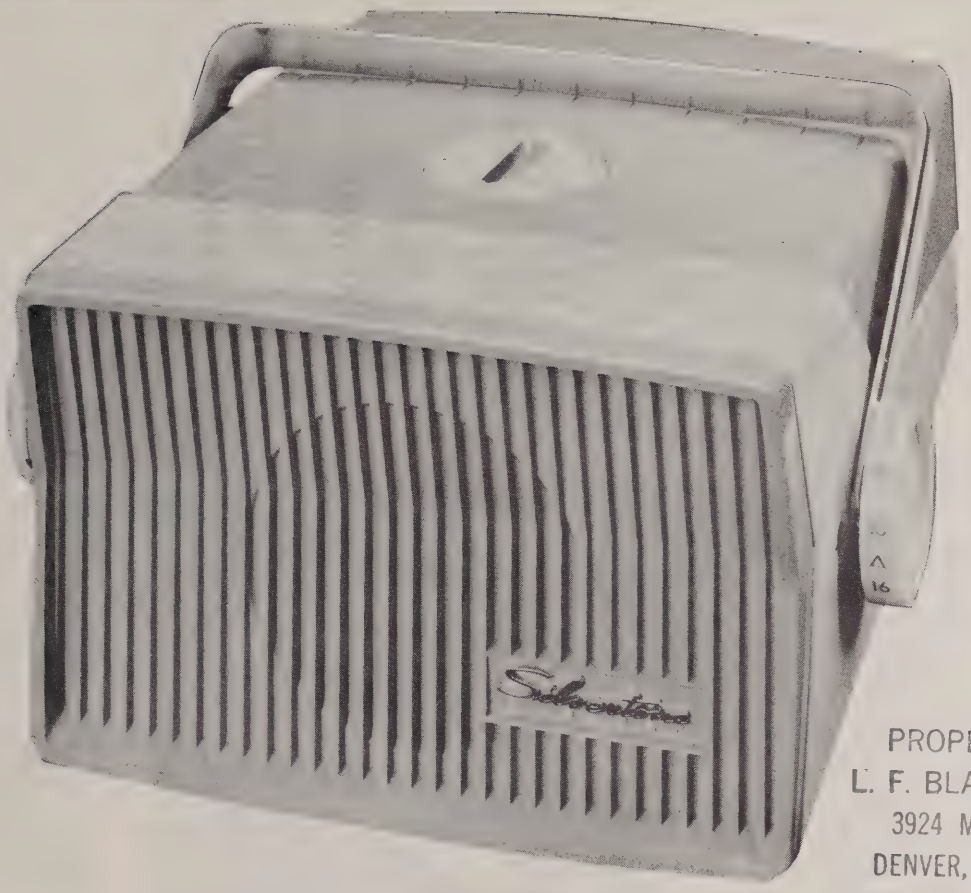
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC

1. DC voltage measurements taken with vacuum tube voltmeter;
2. Socket connections shown as bottom views
3. Measured values are from socket pin to common negative
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

PHOTOFACT* Folder
*TRADE MARK
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

SILVERTONE MODELS 8217, 8218, 8219 (Ch. 528.53110)

SILVERTONE MODELS 8217, 8218, 8219 (Ch. 528.53110)



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L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

SILVERTONE MODELS 8217, 8218, 8219 (Ch. 528.53110)

TRADE NAME	Silvertone Models 8217, 8218, 8219 (Ch. 528.53110)
SUPPLIER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	Three Power Portable AM Receiver
TUBES (Four)	Types 1R5 Converter, 1U4 IF Amplifier, 1U5 Det.-AVC-AF Amp., 3V4 Output
POWER SUPPLY	110-120 Volts AC-DC (or) 3 Volts "A" Supply & 67.5 Volts "B" Supply
RATING	.12 Amp. @ 117 Volts AC (or) 180 MA @ 3 Volts DC & 10 MA @ 67.5 Volts DC
TUNING RANGE—BROADCAST	535KC - 1610KC

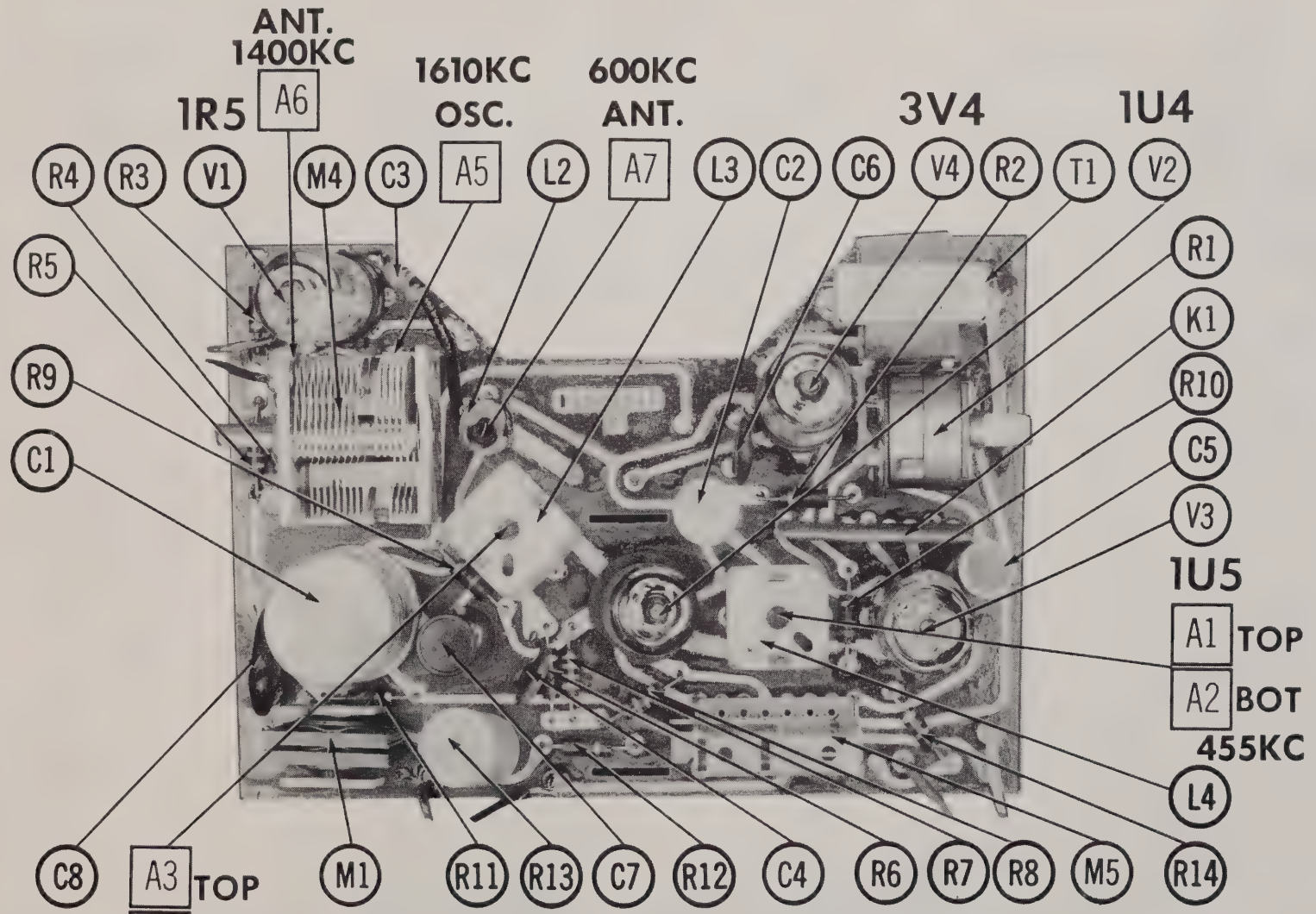
ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use battery power, if possible. If AC power is used, use an isolation transformer when available. If not, connect a .1MFD capacitor in series with low side of the signal generator and B-.
Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1MFD	High side to pin 6 (grid) of 1R5 (V1). Low side to B-.	455KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	High side to pin 6 (grid) of 1R5 (V1). Low side to B-.	1610KC	"	"	A5	"
3.		Loop	1400KC	1400KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Rock tuning gang while making adjustment.
4.		"	600KC	600KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	1R5	
V2	IF Amplifier	1U4	
V3	Det. - AVC - AF Amp.	1U5	
V4	Output	3V4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■70	150	18-54-5			PFP302.38			R2540 *
B	▲30	150							
C	100	10							

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA SILVERTONE PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.047	400	20-44-1			BC6S47J		ACE6147	4SE-S47	
C3	12		15-12061		TCZ-12	CTA6Q12C	TCO-12			NPO 10% ①
C4	5000		15-50217	BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C5	.02	400	20-501			BC6S22J		ACE612	4SE-S22	
C6	2000		15-20211	BPD-002	DD-202	BYA10D2	ED-002	DC522	5HK-D2	
C7	.1	200	20-51-1			BC2P1J		ACE401	2SE-P10	
C8	20000	1400	20-82-0							

① Not used in some versions

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA SILVERTONE PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1Meg	½	24-269-0					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	SILVERTONE PART No.	NOTES
R2	2.2Meg		60-22501	
R3	100K		60-10401	
R4	1500Ω		60-15201	
R5	470Ω		60-47101	
R6	10Meg		60-10601	
R7	47K		60-47301	
R8	47K		60-47301	
R9	27Ω		60-27001	
R10	6.8Meg		60-68501	
R11	1500Ω		60-15201	
R12	2200Ω		60-22201	
R13A	160Ω	3	61-113	
B	2000Ω	10		
R14	270Ω		60-27101	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA SILVERTONE PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	9800Ω	3-4Ω	80-4-1		A-2927 ①	A-3329 ①	24S83 ①	S-11Z ①	① Use original mounting frame.

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA SILVERTONE PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	3½"	PM	3-4Ω	33-270-4	3A07	

PARTS LIST AND DESCRIPTIONS (Continued)
COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA SILVERTONE PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Stick	82-120-0					Includes 2 - 22MMF Trimmer
L2	Osc. Coil	10-32-4					
L3	Input IF	10-63-2	16-6780	BC-356	13-PC7	RF-4	
L4	Output IF	10-63-2	16-6780	BC-357	13-PC8	RF-4	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SILVERTONE PART No.	REPLACEMENT DATA
K1	Audio Coup. Net.	10000MMF, 150MMF, 5000MMF, 2000MMF, 150MMF, 10Meg, 4.7Meg, 1Meg, 3.3Meg	13-13-3	

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA SILVERTONE PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.057A	83-1117 ①	1002A ①	RS065 ①	65 ① M150 ②	① Selenium Type ② Silicon Type

BATTERIES

ITEM No.	VOLTAGE	REPLACEMENT DATA SILVERTONE PART No.	BURGESS "A"	BURGESS "B"	EVEREADY "A"	EVEREADY "B"	MALLORY "A"	MALLORY "B"	RAY-O-VAC "A"	RAY-O-VAC "B"	NOTES
M2	1½V	57-6442	21R		964		M-20		20		2 used
M3	67½V	57-6482		P45		477		M211P		211P	

MISCELLANEOUS

ITEM No.	PART NAME	SILVERTONE PART No.	NOTES
M4	Tuning Cap	19-57-2	2 Gang (Ant. 10-230MMF)
M5	Switch	69-240-0	Power Changeover (Slide Contact Type)

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	52-811-0	On-Off-Volume
Knob	52-818-0	Tuning
Knob	52-825-0	Antenna
Cabinet	42-18-1	Specify Color

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

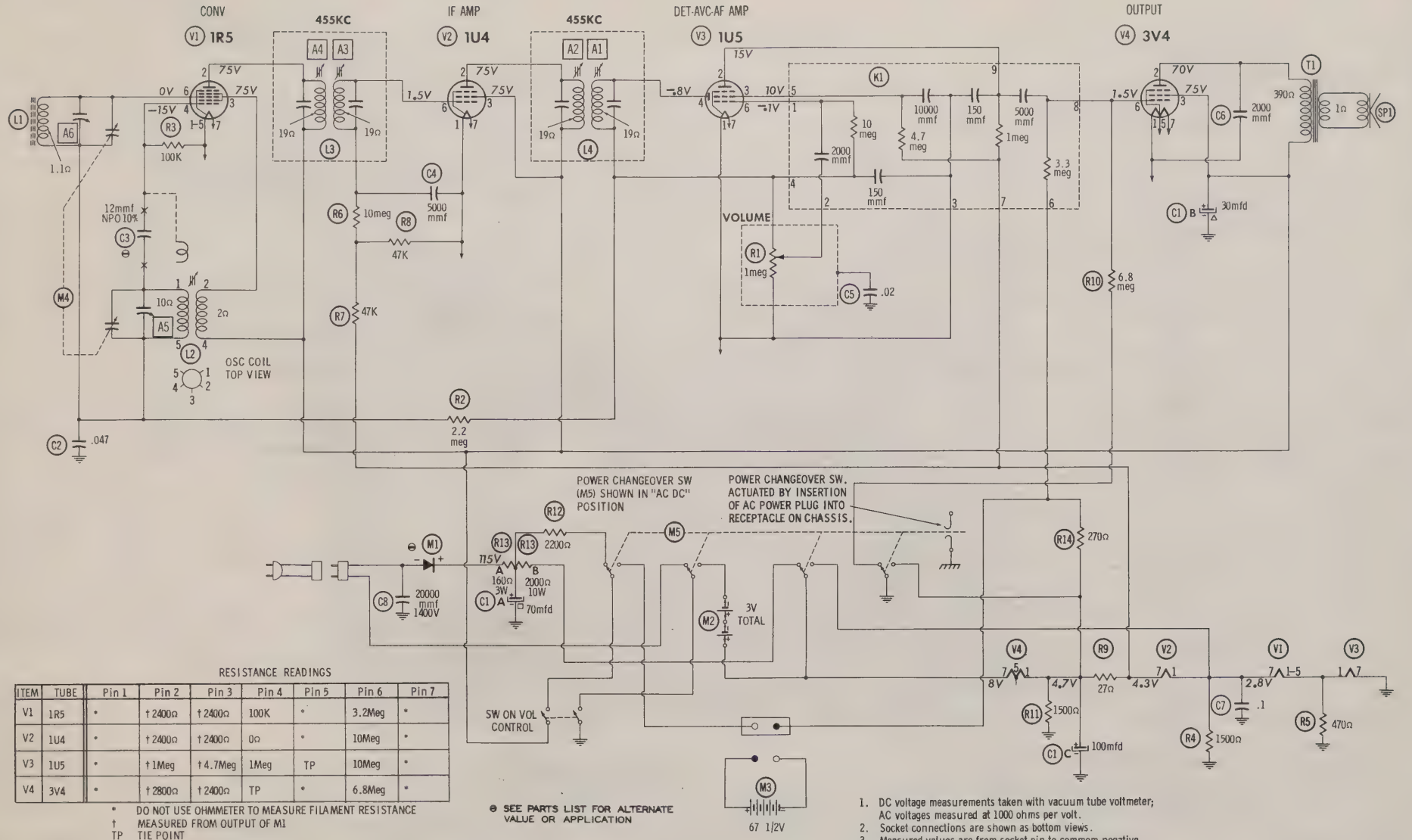
SET 388

FOLDER 9

SILVERTONE MODEL 8217 (Ch. 528.5310)

SILVERTONE MODEL 8217 (Ch. 528.5310)

FOLDER 9



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	1R5	*	†2400Ω	†2400Ω	100K	*	3.2Meg	*
V2	1U4	*	†2400Ω	†2400Ω	0Ω	*	10Meg	*
V3	1U5	*	†1Meg	†4.7Meg	1Meg	TP	10Meg	*
V4	3V4	*	†2800Ω	†2400Ω	TP	*	6.8Meg	*

* DO NOT USE OHMMETER TO MEASURE FILAMENT RESISTANCE
† MEASURED FROM OUTPUT OF M1
TP TIE POINT

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

PHOTOFACT* Folder
*TRADE MARK

SONIC MODEL 415

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

SONIC MODEL 415

SONIC MODEL 415

TRADE NAME	Sonic Model 415
MANUFACTURER	Sonic Industries, Inc., 19 Wilbur St., Lynbrook, N. Y.
TYPE SET	AC Operated AM Receiver with 3 Speed Manual Record Player
TUBES(Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120Volts AC-60 Cycles — RATING .28 Amp. @117 Volts AC (28 Watts without Motor)
TUNING RANGE—BROADCAST	540-1620 KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available if not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

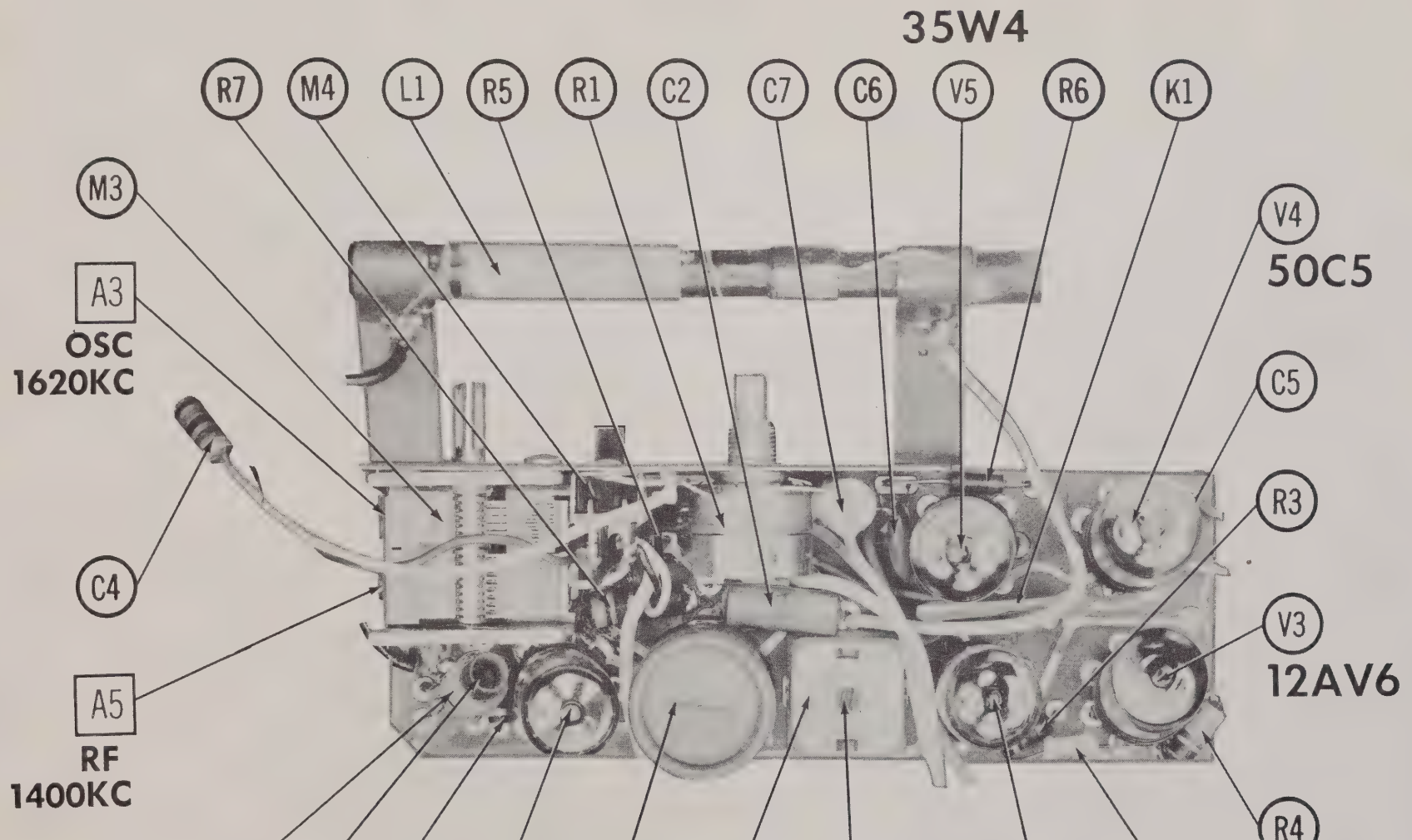
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	High side to pin 7 grid of 12BE6 (V1) Low side to B-.	455 KC (400~ Mod)	Tuning gang fully open	Across voice coil	A1, A2	Adjust for maximum deflection.
2.		Loop	1620KC	Tuning gang fully open	Across voice coil	A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	600KC	600KC	Across voice coil	A4	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		Loop	1400KC	1400KC	Across voice coil	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H312

FOLDER 10



CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SONIC PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150		PRS150V5030	BBRD5315	WD210	TDLD-8	MTD-301	TVA-2450
B	30	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	SONIC PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.02	100		P288N-02	DD-203	CUB2S2	ED-02	GEM-412	2TM-S2	
C3	500			SI500	D6-501	LT6T5	GP-500	UC-535	5GA-T5	
C4	100			SI100	D6-101	LT6T1	GP-100	UC-531	5GA-T1	
C5	5000			BPD-005	DD-502	BYA10D5	ED-005	DC525	5HK-D5	
C6	10000			BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C7	.1	200		P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SONIC PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	500K	½	VC-112					Volume & Switch

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SONIC PART No.	NOTES
	OHMS	WATT		
R2	9100Ω			
R3	4700Ω 5%			
R4	56K	1		

ITEM No.	RATING		SONIC PART No.	NOTES
	OHMS	WATT		
R5	2.2meg			
R6	150Ω			
R7	390Ω	1		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	SONIC PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2500Ω	3-4Ω	25A1-A	Z1101	A-3025	A-3322	24S53	S-12X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SONIC PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω		4A07	

PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		SONIC PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Stick						
L2	Osc. Coil		16-6780	BC-356	13-PC1	RF-4	
L3	IF Trans.						

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	SONIC PART No.	REPLACEMENT DATA	
K1	Audio Coup. Net.	5000mmf, 5000mmf, 220mmf 250mmf, 6.8meg, 470K, 470K		Aerovox Centralab Sprague	PA512 PC-158 DT-5

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	SONIC PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	MOUNT	
M1		414-2 * P-310-2	N8-2	56	PT-1	* Tone Arm complete with cartridge.

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	SONIC PART No.	JENSEN PART No.	WALCO PART No.	
M2		† CRA-552 or ♦ CRA-552D	† W64AGS or ♦ W64AGD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	SONIC PART No.	NOTES
M3	Tuning Cap		2 Gang (Ant. 25-230mmf)
M4	Switch		Radio-Phono (Slide Type DPDT)
M5	Motor		Phono

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

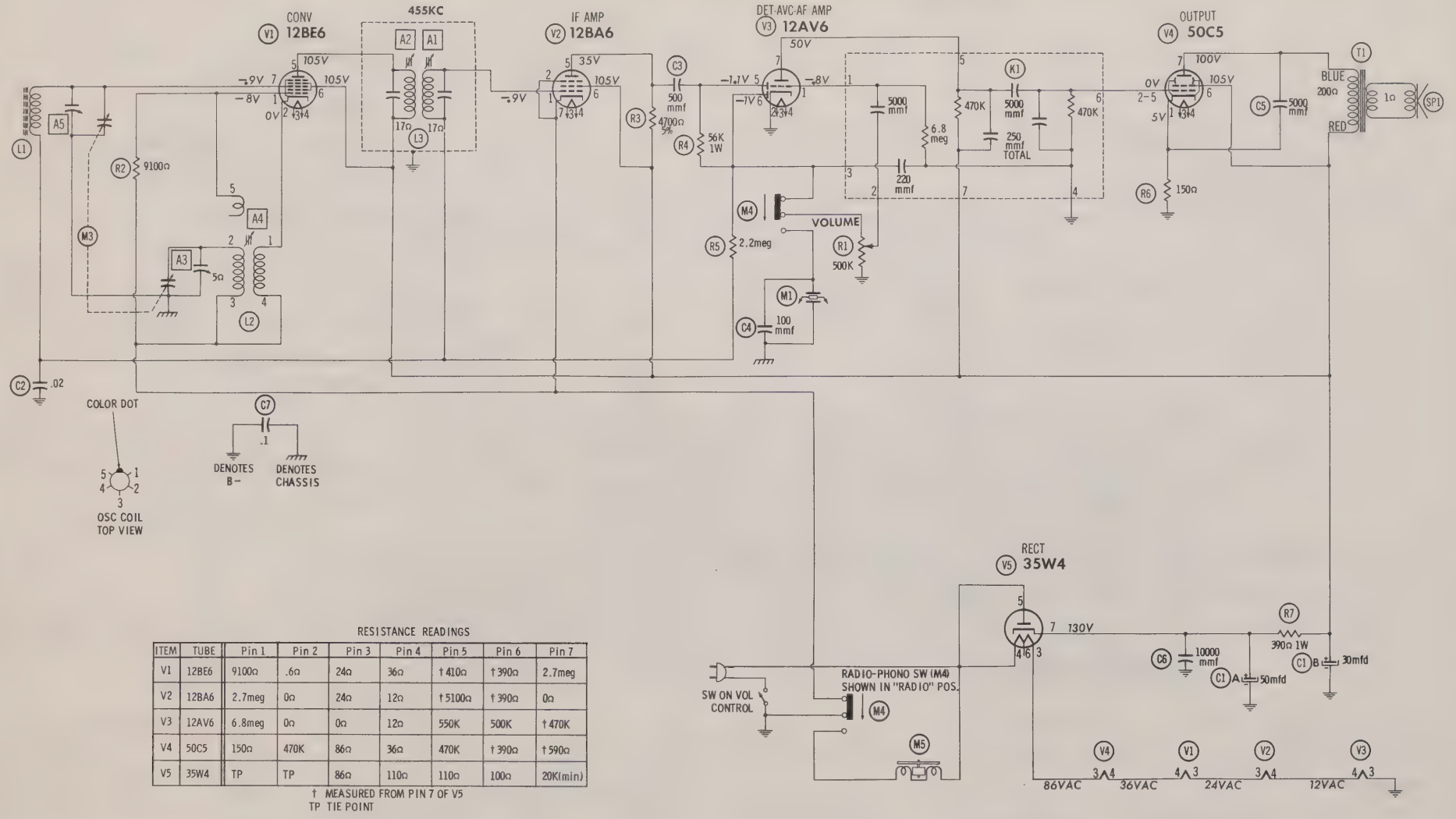
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting)..... Use BELDEN No. 8401

Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

FOLDER 10

SONIC MODEL 415



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	9100Ω	.6Ω	24Ω	36Ω	†410Ω	†390Ω	2.7meg
V2	12BA6	2.7meg	0Ω	24Ω	12Ω	†5100Ω	†390Ω	0Ω
V3	12AV6	6.8meg	0Ω	0Ω	12Ω	550K	500K	†470K
V4	50C5	150Ω	470K	86Ω	36Ω	470K	†390Ω	†590Ω
V5	35W4	TP	TP	86Ω	110Ω	110Ω	100Ω	20K(min)

† MEASURED FROM PIN 7 OF V5
TP TIE POINT

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

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*TRADE MARK
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

STEELMAN MODELS
3AR6-1, 3AR6U-1, 3AR6UA-8

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

STEELMAN MODELS
3AR6-1, 3AR6U-1, 3AR6UA-8

STEELMAN MODELS
3AR6-1, 3AR6U-1, 3AR6UA-8

TRADE NAME	Steelman Models 3AR6-1, 3AR6U-1, 3AR6UA-8
MANUFACTURER	Steelman Phono & Radio Co., Inc., 12-30 Anderson Ave., Mt. Vernon, N.Y.
TYPE SET	AC Operated AM Receiver with 4 Speed Automatic Record Changer
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 (or) 12AT6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-60 Cycles — RATING .26 Amp. @ 117 Volts AC (25 Watts without Motor)
TUNING RANGE—BROADCAST	530-1610KC

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available if not, connect a .1MFD capacitor in series with low side of signal generator and B-. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	High side to pin 7 (grid) of 12BE6(V1) Low side to B-.	455KC (400~ mod)	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum deflection
2.		Loop	1600KC	1600KC	Across voice coil	A5,	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		Loop	1400KC	1400 KC	Across voice coil	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 2 & 3 for best results.

FOR SERVICE INFORMATION ON RECORD CHANGER-SEE MONARCH MODEL UA8-PHONOFACT SET 381 FOLDER 11

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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H306

FOLDER 11

PARTS LIST AND DESCRIPTIONS

STEELMAN MODEL 3AR6-1

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det.-AVC-AF Amp.	12AV6	Note 1
V4	Output	50C5	
V5	Rectifier	35W4	

Note. 1. Alternate type 12AT6 used in some versions.

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	STEELMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	CE-1037-2	PRS150V804020	BBRT84215	TCT3117	TDLT-7	FMT-339	TVA-3455
B	80	150							
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.05	200	CP-503-2	P288N-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C3	.05	200	CP-503-2	P288N-05	DF-503	CUB2S5		GEM-415	2TM-S5	
C4	10000		CC-103-5	BPD-01	DD-103	BYA6S1	ED-01	DC511	5HK-S1	
C5	.1	400	CP-104-2	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	
C6	.01	600	CP-103-6	P688N-01	D6-103	CUB6S1	GP-10000	GEM-611	6TM-S1	
C7	.1	400	CP-104-2	P488N-1	DF-104	CUB4P1		GEM-401	4TM-P1	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	STEELMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1meg	½	VC-42	B-70-S	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
C	Switch		-	Not Req.	SWE-12	76-1	US-26	
R2A	100K	½	VC-102	B-41	A47-100K-Z	Q13-128	U39	Tone (Note 1.)
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

Note. 1. 500K unit used in some versions (Part#VC-44)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		STEELMAN PART No.	NOTES
	OHMS	WATT		
R3	2.2meg		RC-225-1	
R4	22K		RC-223-1	
R5	150Ω	1		
R6	150Ω	1		
R7	2200Ω	1		
R8	330Ω	1	RC-331-4	

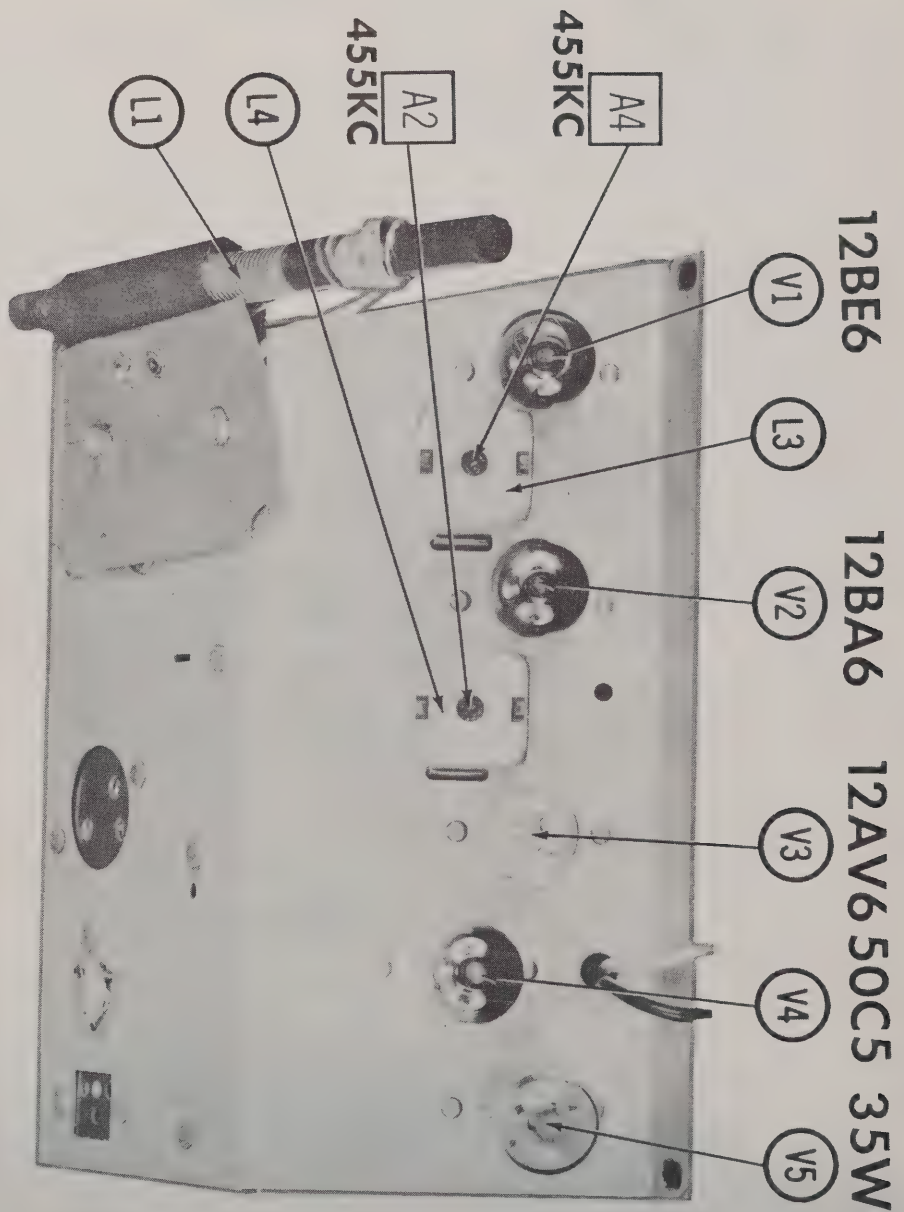
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	STEELMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2400Ω	3-4Ω	TR-125	Z1103	A-2928	AU-603	A-3876	22S46	S-1X	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	STEELMAN PART No.	QUAM PART No.	
SP1	8"	PM	3-4Ω	SP-103-2		

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		STEELMAN PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Stick	LPFE-23					
L2	Osc. Coil	LC-10-1	14-1073	BC-393	69 Osc.		
L3	Input IF	LF-50	16-6758	BC-352	12-C1	RF-1	
L4	Output IF	LF-50	16-6758	BC-353	12-C2	RF-2	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	STEELMAN PART No.	REPLACEMENT DATA	
K1	Audio Coup. Net.	5000mmf, 5000mmf, 220mmf, 250mmf, 6.8meg, 470K, 470K,	PC-151	Aerovox Centralab Cornell-Dubilier Erie Sprague	PA-113-2 PC-151 116TM2 1408-02 DT-2

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA					REMARKS
	STEELMAN PART No.	ASTATIC PART No.		ELECTRO-VOICE PART No.		
		CARTRIDGE	NEEDLE	CARTRIDGE	MOUNT	
M1	TO-284-OV	422-TS	N8-1 and N8-3	56	PT-1	

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA			REMARKS
	STEELMAN PART No.	JENSEN PART No.	WALCO PART No.	
M2	N-5304-N (78 RPM)	† CRA-55 or ♦ CRA-55D	† W64S or ♦ W64D	† Jewel ♦ Diamond
	N-5304-L (LP)	† CRA-55LP or ♦ CRA-55LPD	† W64MGS or ♦ W64MGD	

MISCELLANEOUS

ITEM No.	PART NAME	STEELMAN PART No.	NOTES
M3	Tuning Cap	CV-72	2 Gang (Ant. 35-485mmf, Osc. 35-200mmf)
M4	Switch	SW-45	Radio-Phono (Slide Type DPST)
M5	Motor	8M-59	Four Pole

CABINETS & CABINET PARTS

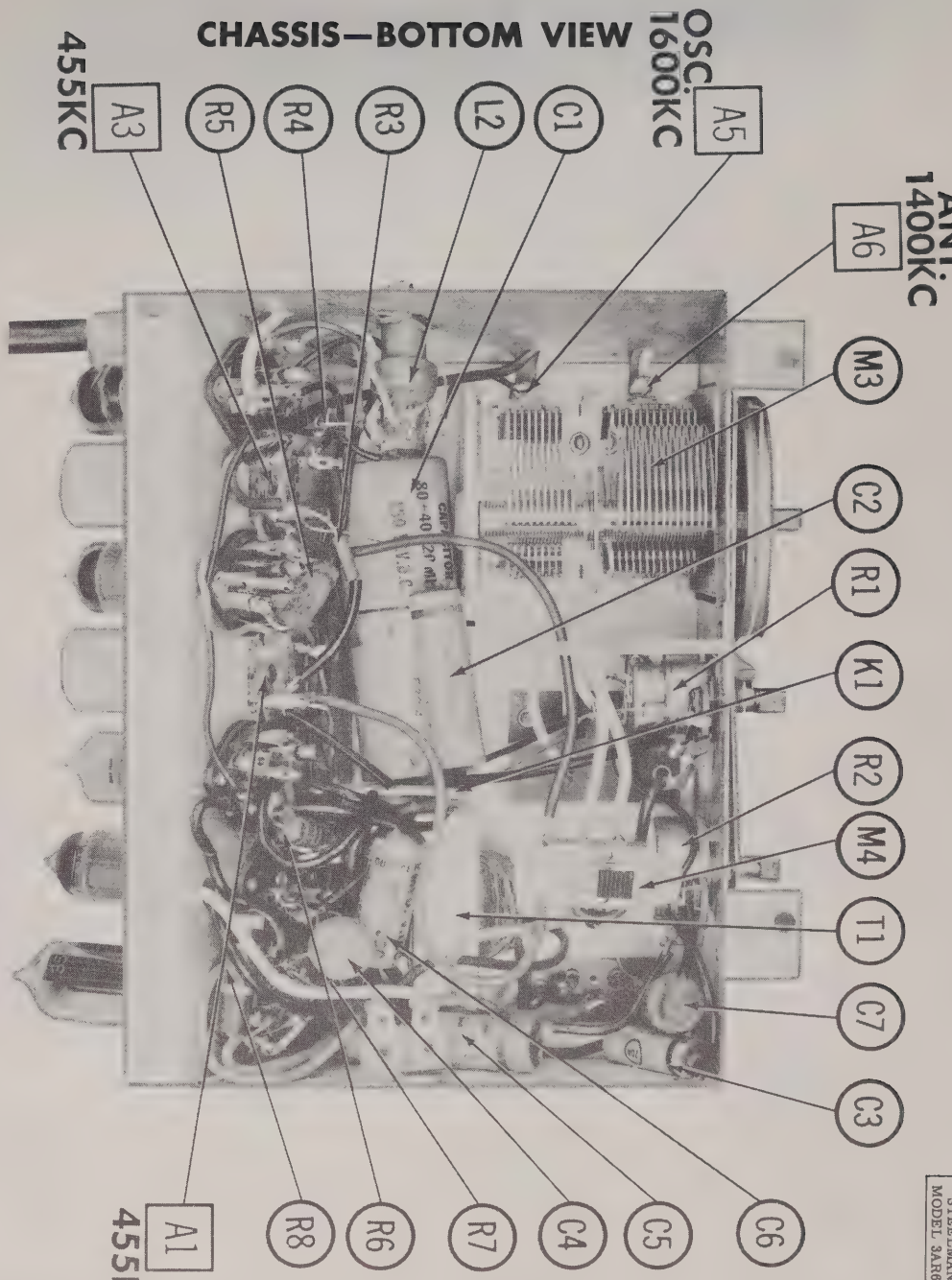
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

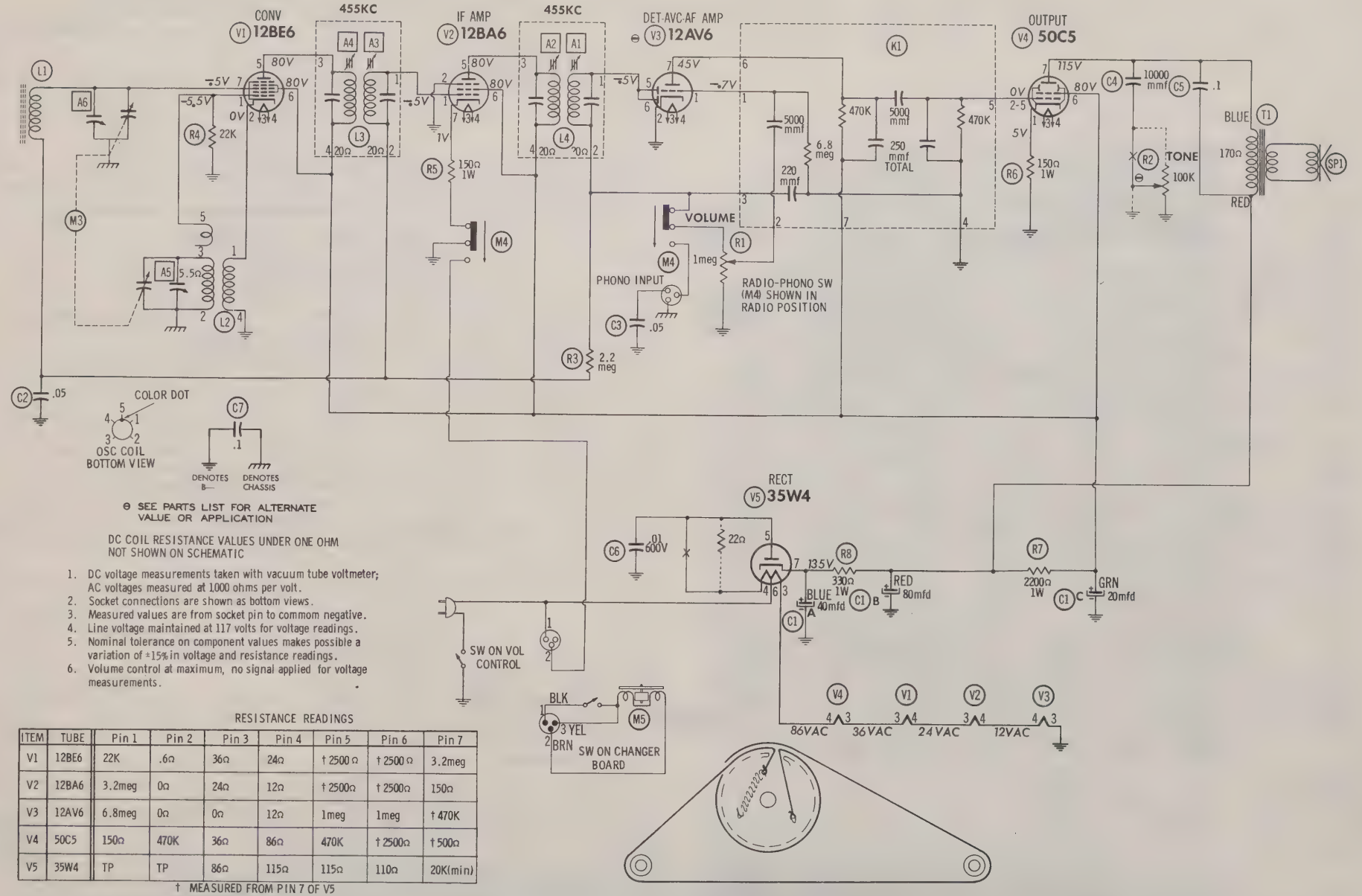
NAME	PART NO.	DESCRIPTION
Knob	KNB-1010	On-Off-Volume
Knob	KNB-10110	Tone
Knob	KNB-10108	Tuning
Cabinet	CA-1048	Model 3AR6-1/UA-8

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)..... Use BELDEN No. 8401
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW





⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1,000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to commom negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.6Ω	36Ω	24Ω	† 2500 Ω	† 2500 Ω	3.2meg
V2	12BA6	3.2meg	0Ω	24Ω	12Ω	† 2500Ω	† 2500Ω	150Ω
V3	12AV6	6.8meg	0Ω	0Ω	12Ω	1meg	1meg	† 470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	† 2500Ω	† 500Ω
V5	35W4	TP	TP	86Ω	115Ω	115Ω	110Ω	20K(min)

† MEASURED FROM PIN 7 OF V5
TP TIE POINT

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

DIAL CORD STRINGING

PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

STROMBERG-CARLSON MODEL AU-64

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

STROMBERG-CARLSON
MODEL AU-64

STROMBERG-CARLSON
MODEL AU-64

TRADE NAME	Stromberg-Carlson Model AU-64
MANUFACTURER	Stromberg-Carlson Co., Sound Div., 1400 N. Goodman St., Rochester 9, N.Y.
TYPE SET	AC Operated 3 Channel Audio Amplifier
TUBES (Six)	Types 12AX7/ECC83 Mic 1 Preamp.-Mic 2 Preamp., 12AT7/ECC82 AF Amplifier, 6AV6 Phase Inverter, (2) 6L6GB Output, 5U4GB Rectifier
POWER SUPPLY	105-125 Volts AC-50/60 Cycles RATING .88 Amp. @ 117 Volts AC (95 Watts)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

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H238

FOLDER 12

PARTS LIST AND DESCRIPTIONS

STROMBERG-CARLSON
MODEL AU-64

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Mic. 1 Preamp. - Mic. 2 Preamp.	12AX7/ ECC83	
V2	AF Amplifier	12AT7/ ECC82	
V3	Phase Inverter	6AV6	
V4	Output	6L6GB	
V5	Output	6L6GB	
V6	Rectifier	5U4GB	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Stromberg-Carlson PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲30	500	111632-000		BO530			D-275	R2529 *
B	■30	500							
C2A	▲40	400	111001-002	PR4-185	BBRQ0170.5			T-160	R2598 *
B	30	350							
C	▲20	300							
C3	50	6		PRS25V50	BBR50-6	TC29	TD-50-6	MT-0250	TVA-1100
C4	50	50	111634-000	PRS50V50	BR505	TC39	TD-50-50	MT-0550	TVA-1308

* Non-catalog item.

FIXED CAPACITORS

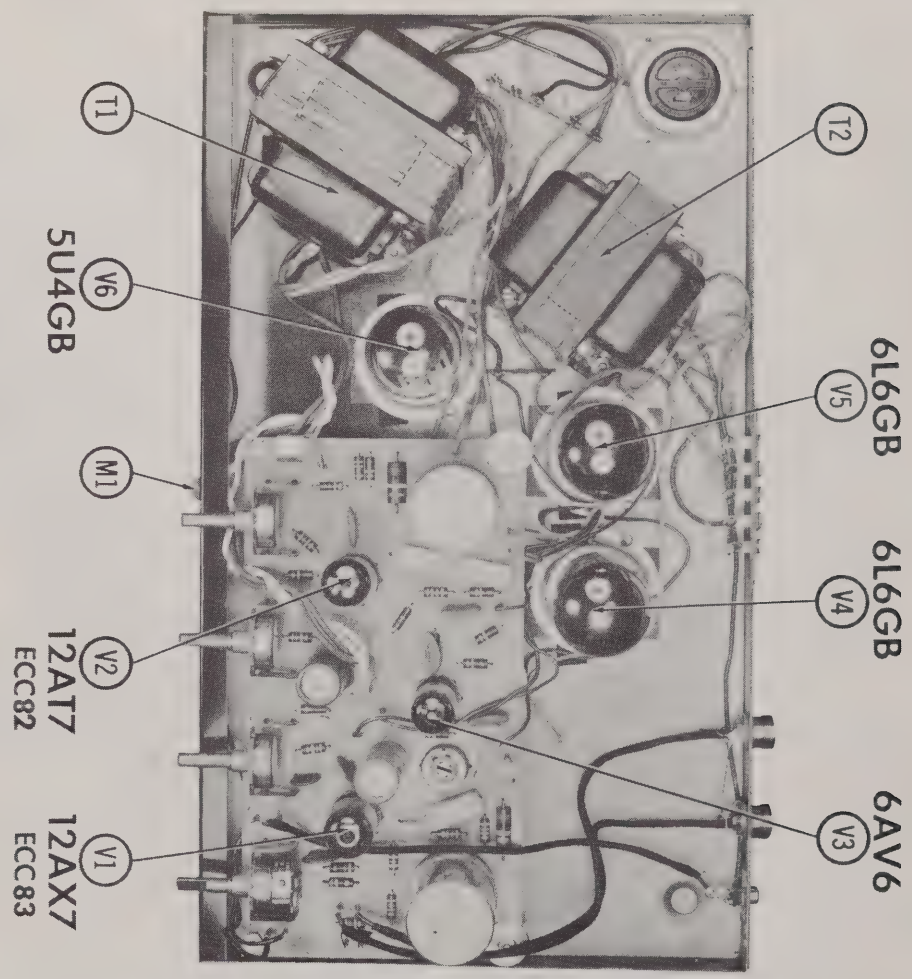
Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	Stromberg-Carlson PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	20000			BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C6	20000			BPD-02	DD-203	BYB6S2	ED-02		5HK-S2	
C7	25000								TG-S25	
C8	1500			BPD-0015	DD-152	BYA10D15	ED-1500	DC5215	5HK-D15	
C9	25000								TG-S25	
C10	25000								TG-S25	
C11	25000								TG-S25	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Stromberg-Carlson PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	500K	½	145655-000					Tone & Switch
R2	500K	½	145656-000					Phono Input
R3	500K	½	145656-000					Micro #2 Input
R4	500K	½	145656-000					Micro #1 Input
R5	100Ω	2	145654-000					Hum Adj. (Wire wound)

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Stromberg-Carlson PART No.	NOTES
R6	4.7Meg			
R7	470K			
R8	4.7Meg			
R9	470K			
R10	150K			
R11	470K			
R12	470K			
R13	470K			
R14	220K			
R15	2200Ω			
R16	150K			
R17	220K			
R18	3300Ω			

ITEM No.	RATING OHMS	RATING WATT	Stromberg-Carlson PART No.	NOTES
R19	120K			
R20	150K			
R21	47K			
R22	47K			
R23	1200Ω 5%			
R24	100K			
R25	100K			
R26	250Ω	5		
R27	5000Ω	10		
R28	100K	2		
R29	10K	1		
R30	47K			
R31	47K			

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117VAC @ .88A	760VCT @ .100A	5VAC @ 3A	6.3VAC @ 3A	161803	P9316 ①	P-3155 ①	PC8411 ①	22R33 ①	R-18A ①

① Drill new mounting holes.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Stromberg-Carlson PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5300Ω CT	70V tap @ 16Ω, 8Ω, 4Ω	161361						

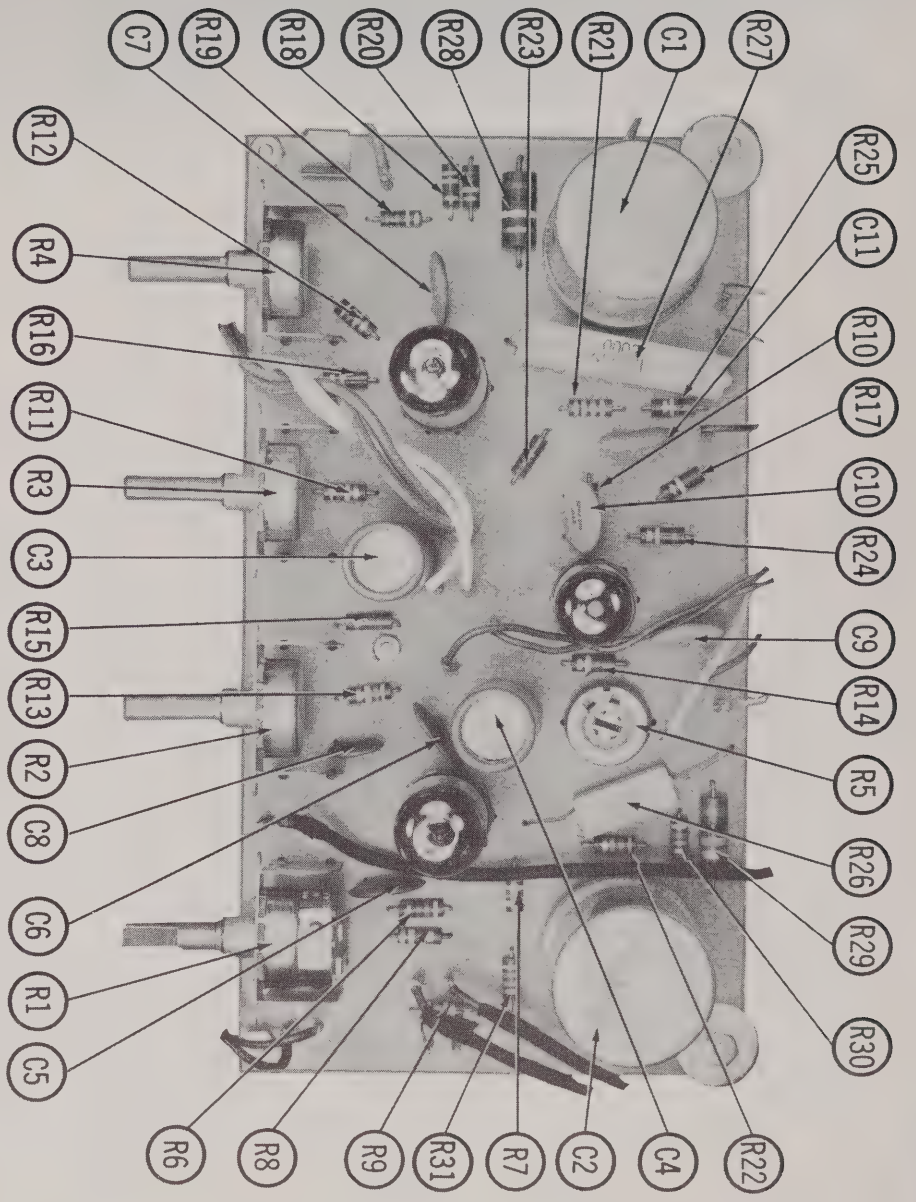
MISCELLANEOUS

ITEM No.	PART NAME	Stromberg-Carlson PART No.	NOTES
M1	Pilot Lamp		#51

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

PRINTED BOARD

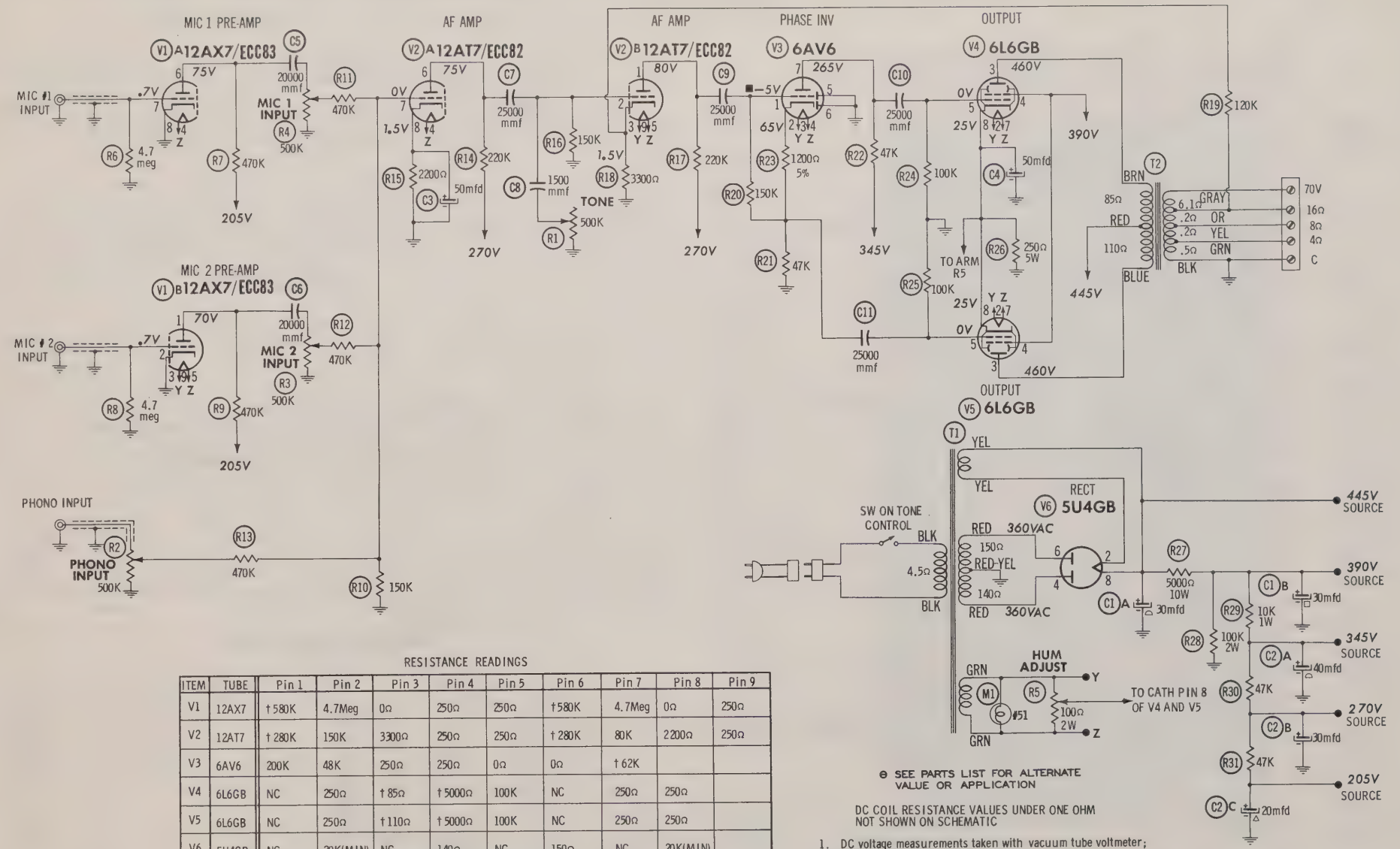


SET 388 FOLDER 12

FOLDER 12

STROMBERG-CARLSON MODEL AU-64

STROMBERG-CARLSON MODEL AU-64



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†580K	4.7Meg	0Ω	250Ω	250Ω	†580K	4.7Meg	0Ω	250Ω
V2	12AT7	†280K	150K	3300Ω	250Ω	250Ω	†280K	80K	2200Ω	250Ω
V3	6AV6	200K	48K	250Ω	250Ω	0Ω	0Ω	†62K		
V4	6L6GB	NC	250Ω	†85Ω	†5000Ω	100K	NC	250Ω	250Ω	
V5	6L6GB	NC	250Ω	†110Ω	†5000Ω	100K	NC	250Ω	250Ω	
V6	5U4GB	NC	20K(MIN)	NC	140Ω	NC	150Ω	NC	20K(MIN)	

† MEASURED FROM PIN 8 OF V6.
■ MEASURED FROM PIN 2 OF V3.
NC NO CONNECTION.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

388-12

PHOTOFACT* Folder

*TRADE MARK

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

TECH-MASTER MODEL 19

PROPERTY OF
L. F. BLANKENSHIP
3924 MEADE ST.
DENVER, COLORADO

TECH-MASTER MODEL 19

TECH-MASTER MODEL 19

TRADE NAME	Tech-Master Model 19 (Kit Form Model 19K)
MANUFACTURER	Tech-Master Corp., 75 Front Street, Brooklyn, N. Y.
TYPE SET	AC Operated Audio Amplifier
TUBES (Six)	Types 12AX7 Phono Preamplifier, 12AU7/ECC82 AF Amplifier, 6AN8 AF Amp.-Phase Inv., (2) 6550 Output, 5U4G Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING 1.5 Amp. @117 Volts AC (170Watts)

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H331

DATE 2-58 SET 388 FOLDER 13

FOLDER 13

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	Phono Preamplifier	12AX7
V2	AF Amplifier	12AU7/ECC82
V3	AF Amp-Phase Inverter	6AN8

ITEM No.	USE	TYPE
V4	Output	6550
V5	Output	6550
V6	Rectifier	5U4GB

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Tech-Master PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■ 20	500			D0179.5	FP475		T-205 MT-5010	R2539 *
B	● 20	500							
C	▲ 10	500							
D	20	450							
C2	50	50		PRS50V50	BR505	TC39	TD-50-50	MT-0550	TYA-1308
C3A	■ 20	250		AFH2-26	B0210	FP217	TMD-24	D-110	TVL-2515
B	▲ 20	250							

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Tech-Master PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	ERIE PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	5000			1464-005		1DR5D5		MCB465	MS-25	10%
C5	1000			1464-001		1R5D1	ED-1000	MCB255	MS-21	10%
C6	1600			1464-0016		1R5D16	CY20C162V		MS-216	10%
C7	900					1R5T9				10%
C8	780									10%
C9	15000			BPD-015	DD16-153	BYA10S15	ED-015		5HK-S15	
C10	3900			BPD-004	DD-392	BYA10D4	ED-004	UC-524	5GA-D39	①
C11	.015	400		P488N-015	DD16-153	CUB6S15	ED-015	GEM-4115	4TM-S15	
C12	.047	400		P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
C13	.002	200		P288N-002	D6-202	CUB6D2	GP-2000	GEM-622	6TM-D2	
C14	.02	200		P288N-02	DD-203	CUB4S2	ED-02	GEM-412	4TM-S2	
C15	180			1469-00018	TCZ-180	22R5T18	CY15C181V		MS-318	5%
C16	1000			1464-001		1R5D1	ED-1000	MCB255	MS-21	10%
C17	4000			BPD-004	DD-402	BYA10D4	ED-004	UC-524	5GA-D4	
C18	.047	400		P488N-047	DF-503	CUB4S47		GEM-4147	4TM-S47	
C19	.1	600		P688N-1	DF-104	CUB6P1		GEM-601	6TM-P1	
C20	100			1469-0001	TCZ-100	22R5T1	CY15C101J	MCE235	MS-31	
C21	.22	600		P688N-22		CUB6P22		GEM-6022	6TM-P22	
C22	.22	600		P688N-22		CUB6P22		GEM-6022	6TM-P22	
C23	.1	200		P288N-1	DF-104	CUB2P1		GEM-201	2TM-P1	

① Some versions use 4000mmf in this application

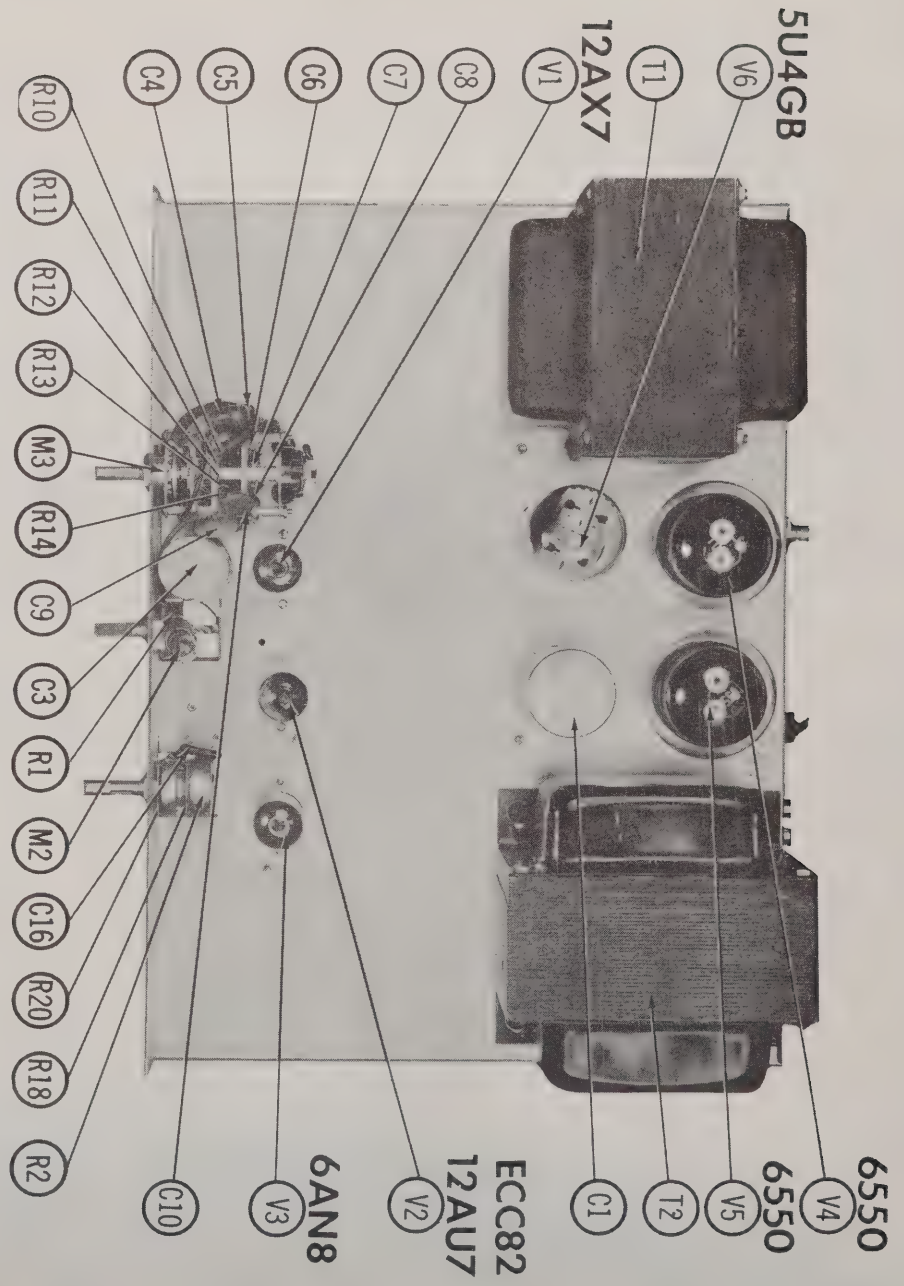
CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Tech-Master PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	VC-32	B-70	A47-1meg-Z	Q13-137	U53	Volume
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
R2A	1meg	½	VC-33	F1-51		♦	■ UE3765	Bass
B	1meg	½		R2-52		♦		Treble
R3A	1500Ω	½	VC-30	AB-6	A47-1500-S	Q11-109	U6	Hum Null
B	Shaft			Not Req.	FKS-1/4	Not Req.	Not Req.	
R4A	100K	½	VC-31	B-40	A47-100K-S	Q11-128	U41	Magnetic Cartridge Load
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

♦ Concentrikit Equivalent; K-2Kit, Base Elements and Shafts: B11-137, P1-020 (Panel) B13-137, R1-103 (Rear)

■ STA-LOC Equivalent: FB16L, 0S625, RU16A, IS1125

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Tech-Master PART No.	NOTES
R5	4700Ω			
R6	56K			Note 1.
R7	2200Ω			
R8	10meg			
R9	56K			
R10	82K			
R11	82K			
R12	82K			
R13	82K			
R14	82K			
R15	22K			
R16	100K			
R17	3300Ω			
R18	100K			
R19	100K			
R20	15K			
R21	22K			
R22	3900Ω	1		

ITEM No.	RATING OHMS	RATING WATT	Tech-Master PART No.	NOTES
R23	470K			
R24	270K			
R25	15K			
R26	1.2meg			
R27	10K	1		
R28	680Ω			
R29	15K			
R30	47K 5%	1		
R31	8200Ω	1		
R32	47K 5%			
R33	1000Ω			
R34	51K 5%			
R35	5600Ω 5%			
R36	10K 5%	1		Note 2.
R37	1000Ω			
R38	51K 5%			
R39	50Ω	10		
R40	5.1Ω	1		
R41	2200Ω			

Note 1. Low noise resistor
Note 2. Some versions use 6800Ω in this application

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	REPLACEMENT DATA Tech-Master PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ 1.5A	920VCT @ .190A Tap @ 110V @ .005A	5V @ 3A	6.3V @ 4.5A	TP303					

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Tech-Master PART No.	Halldorson PART No.	Merit PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	2200Ω CT	16Ω Tap @ 8Ω, 4Ω	T122						

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Tech-Master PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.005A		1159	RS050	50	

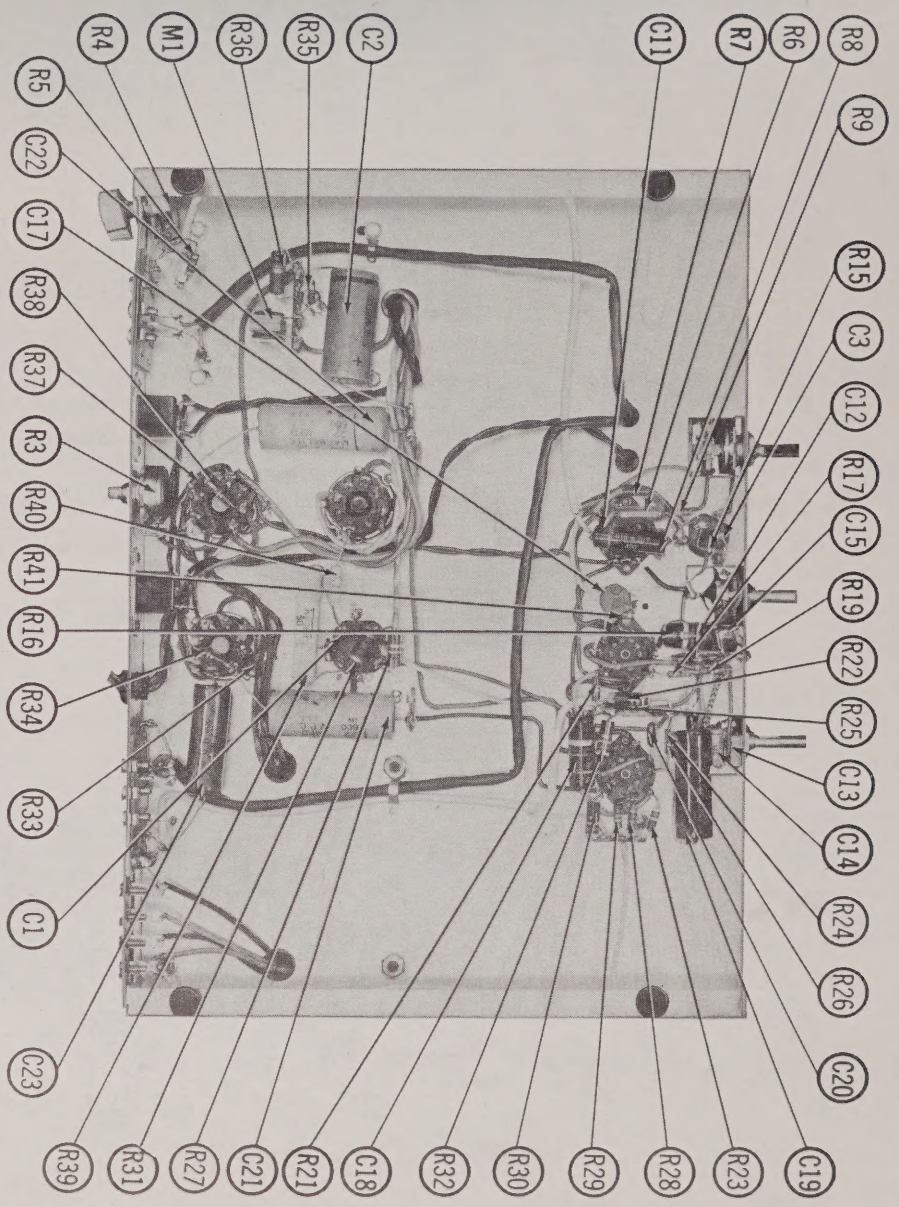
MISCELLANEOUS

ITEM No.	PART NAME	Tech-Master PART No.	NOTES
M2	Pilot Lamp		#47
M3	Switch		On-Off-Selector (Rotary Wafer)

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

CHASSIS—BOTTOM VIEW

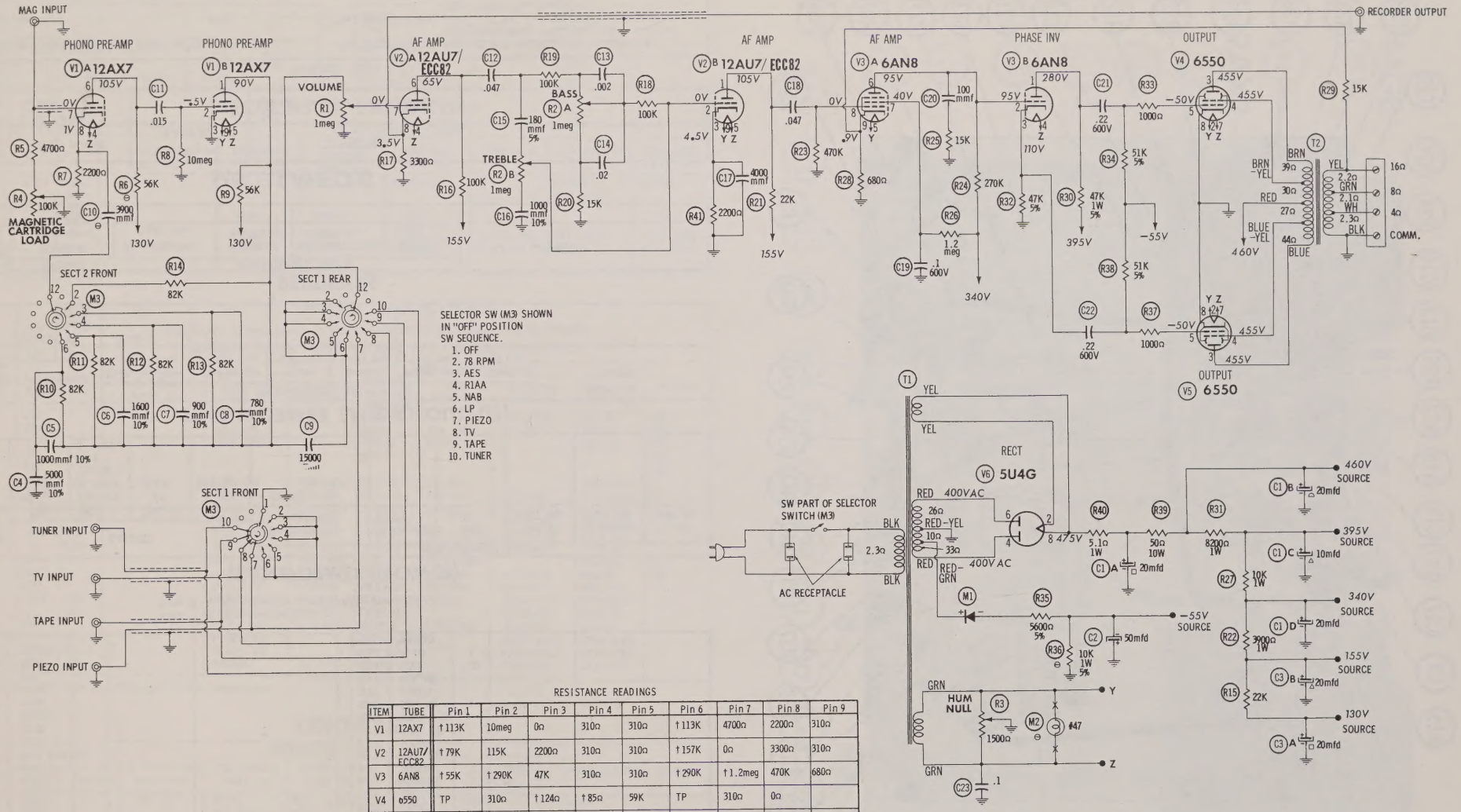


SET 388 FOLDER 13

FOLDER 13

TECH-MASTER MODEL 19

TECH-MASTER MODEL 19



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†113K	10meg	0Ω	310Ω	310Ω	†113K	4700Ω	2200Ω	310Ω
V2	12AU7/ ECC82	†79K	115K	2200Ω	310Ω	310Ω	†157K	0Ω	3300Ω	310Ω
V3	6AN8	†55K	†290K	47K	310Ω	310Ω	†290K	†1.2meg	470K	680Ω
V4	6550	TP	310Ω	†124Ω	†85Ω	59K	TP	310Ω	0Ω	
V5	6550	TP	310Ω	†126Ω	†82Ω	59K	TP	310Ω	0Ω	
V6	5U4G	NC	20K(min)	NC	36Ω	NC	33Ω	NC	20K(min)	

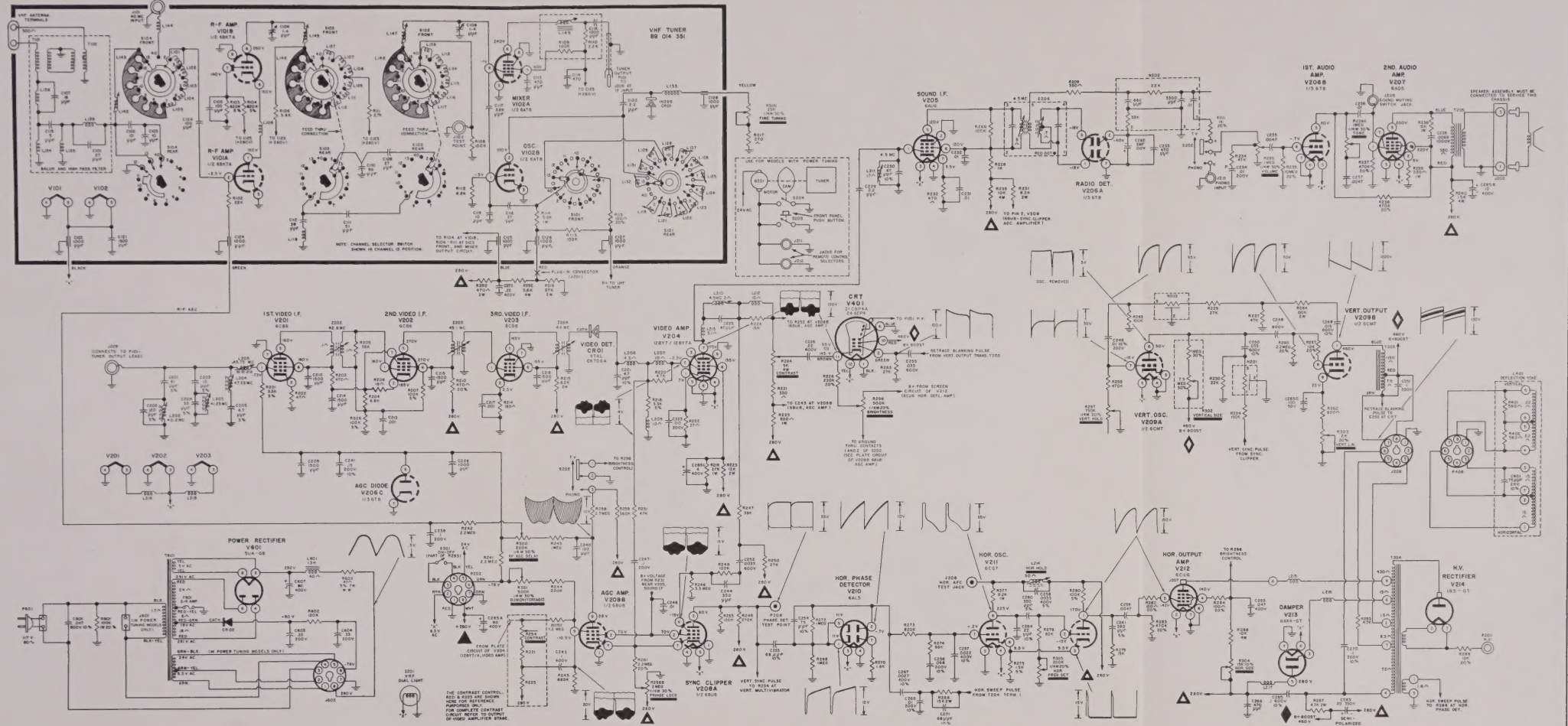
† MEASURED FROM PIN 8 OF V6
NC NO CONNECTION
TP TIE POINT

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

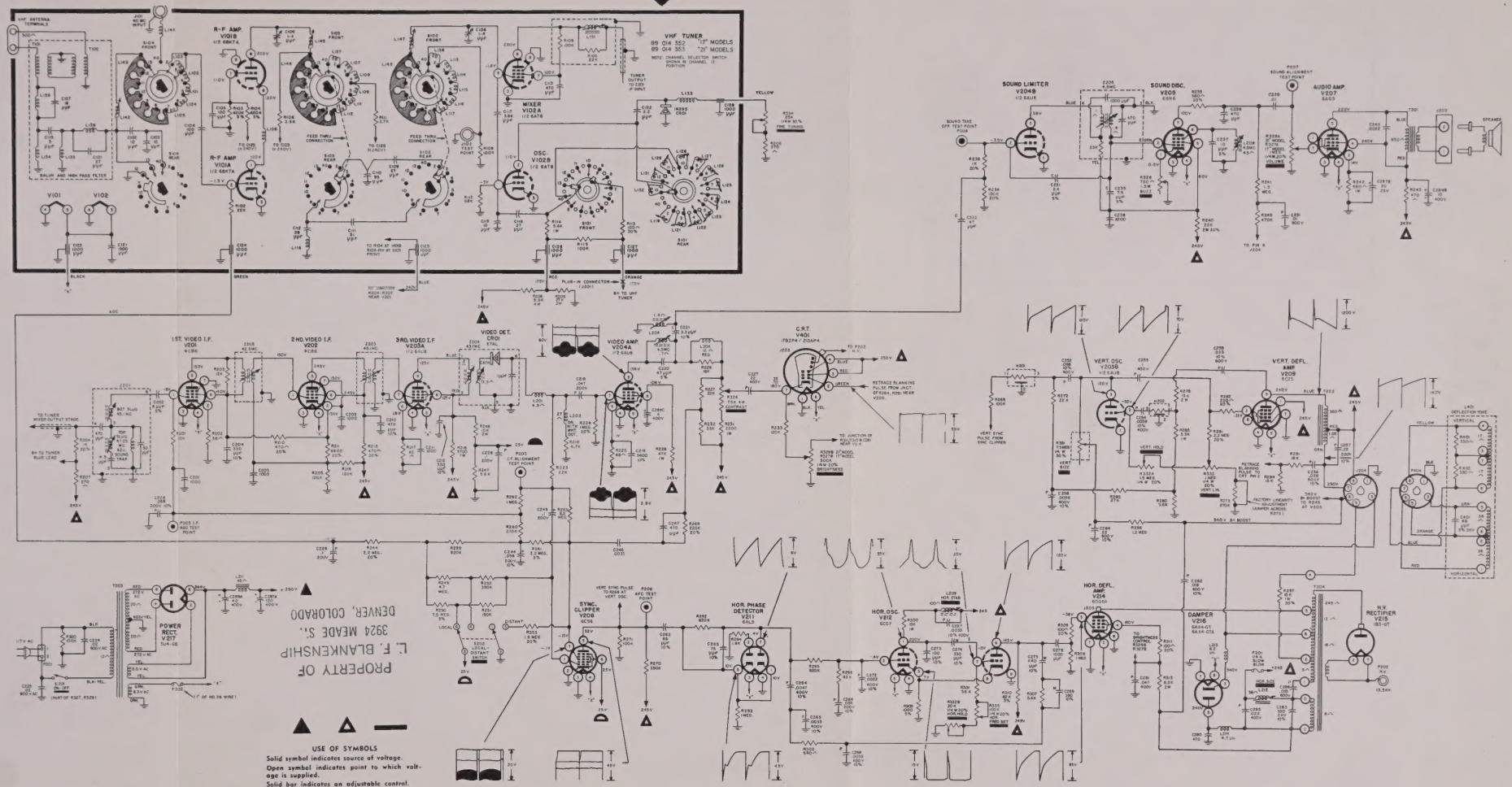
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

DUMONT
CHASSIS
RA400
RA401



SCHEMATIC COURTESY OF ALLEN B. DUMONT LABORATORIES

DUMONT
CHASSIS
RA402
RA403


VHF TUNER
89 014 352 "17" MODELS
89 014 353 "20" MODELS
R-F AMP V101B 1/2 6BK7A
R-F AMP V101A 1/2 6BK7A
MIXER V102A 1/2 6AT8
OSC. V102B 1/2 6AT8
SOUND LIMITER V204B 1/2 6AU8
SOUND DISC. V205 6BN6
AUDIO AMP. V207 6AQ5
1ST. VIDEO I.F. V201 6CB6
2ND. VIDEO I.F. V202 6CB6
3RD. VIDEO I.F. V203A 1/2 6AU8
VIDEO DET. CR01
VIDEO AMP. V204A 1/2 6AU8
C.R.T. V401
VERT. OSC. V203B 1/2 6AU8
VERT. DEFL. AMP. V209 6CG7
SYNC. CLIPPER V206 6CS6
HOR. PHASE DETECTOR V211 6AL5
HOR. OSC. V212 6CG7
HOR. DEFL. AMP. V214 6DQ6A
DAMPER V216 6AX4-GT 6AX4-GTA
H.V. RECTIFIER V215 1B3-GT
POWER RECT. V217 5U4-GB
PROPERTY OF L. F. BLANKENSHIP 3924 MEADE ST. DENVER, COLORADO
USE OF SYMBOLS
Solid symbol indicates source of voltage.
Open symbol indicates point to which voltage is supplied.
Solid bar indicates an adjustable control.

SCHEMATIC COURTESY OF ALLEN B. DUMONT LABORATORIES